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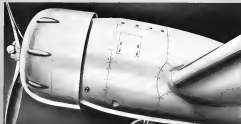
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AVIATION

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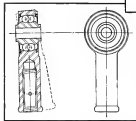
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July 17, 1935

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AVIATION for August, 1935



The roof of the post office at 250 Broadway was used for a demonstration and delivery by Gen. Levy to a Ketterer airplane with the author in a Fieseler.

WHEN two direct control autogiros landed and took off from the roof of Philadelphia's new central post office several weeks ago, I had first hand confirmation of several theories concerning rooftop operations evolved during the years I had been talking about them. First Gen. Levy of the Ketterer Langiers Corporation (who flew the other machine) and I found the actual flying job to have no technical difficulty whatever.

The machine I flew, an experimental two-place eddy type, was the first of the direct control variety in this country. It has been in constant experimental use for more than two years and bears plentiful evidence of its experimental nature. Nevertheless, the small 75 hp. machine could have been quite easily loaded and taken off from its area regardless of the size of the 200x360-ft. roof available.

The general subject of rooftop operations now concerning post office officials in many metropolitan centers,

directly involves aerodynamics as well as architectural principles and gives rise to the thought that the present fashion for surrounding all types of government motor cars to refrigerators, may mean a logical extension to the actual "landing" of buildings.

This would not be as absurd as the current craze for surrounding municipalities of slowly moving objects, where air resistance can never be important. We are only concerned with aerodynamics to reduce turbulence air conditions around buildings. Slight changes in the shape of a building or group of buildings can affect an important improvement in elevator operation from their roofs by lessening the violence of gusts and eddies which swirl about them in ever changing fairs.

Basic masses of turbulence are and immediately around buildings separate naturally into two groups—direct currents and eddy currents. Direction and velocity of wind are of course within the mere potent first category. Thermal conditions, both natural and

Rooftop Giroports

By James G. Ray
Aviation Correspondent



"Rooftop landing facilities—Airport Connections," may soon become familiar phrases in the rental of office space. The architectural requirements for rooftop airports appear to be relatively simple. Less confidence was felt about piloting problems until the author set out to reduce them to a systematized technique.

artificial, produces secondary movements of air which may have very real effect. The intermediate air in the two groups forms a stasis in itself.

At first examination the subject appears too complicated for development of a solving technique. As the study becomes apparent that certain general conditions, badly disturbed in the case of most buildings, may be used as the basis for a technique of building operation, which may be built up with the growing experience of pilots.

Thus, an upward current of air, extending well above the parapet, may usually be expected on the windward side of a structure if there is any considerable wind velocity. The "flut" of the building behind by such a wind will probably be in an area of comparatively quiet air.

From the side exposed to warm rays of the sun for a considerable time, there will be an upward current produced by the natural tendency of warm air to rise. A paired courtyard exposed to the sun at the base of a wall also exposed to its rays, produces an undesirable volume of heated air, or wind which "drifts" upward along the sunny side of the building, adding substantially to the upward velocity of the rising column. Porches or heated tacked walls naturally radiate a great deal more heat than would an area placed to mass shrubs or trees. In winter there will be a rising column of air created a heated building, created by the condition of artificial heat through the walls. This generally rising condition of the air in such a structure will, of course, be acted upon by wind velocity, direction and external thermal conditions again.

Surprisingly enough, the rising action on the windward side of a building does not necessarily have a downward counterpart on the leeward side. For one thing, the artificial radiation at least from a heated building, produces on the leeward portion because of internal movement of air caused by drafts and leakage around windows on the windward face.

Generally, the movement over the leeward parapet will be in a horizontal direction, the air shortly afterward making a wide turn upward or downward. No definite indication of the direction has been found. A quartering wind acting on any corner of a building is usually helpful. Naturally, the movement presented is no longer when they run diagonally across the greatest available length of leading face.

Immediately over the corner of a building is a considerable tendency to assembling the flow of a sharp corner at high speed. The wind acts on this "flow" much as does the flapping spray from the end of a sail in a strong breeze. The air curves upward, in heavy winds it falls at "spray" over the leeward face, rising, it tumbles downward over the side. The air

about the peak, or corner, presented to the wind usually is in comparative calm. To lessen the dangerous vertical currents in sailing structures, we can utilize a device well known in aerodynamics, the form of which might serve as architectural as well as a functional purpose. This is a deflector in the form of a curved edge projecting several feet beyond the entire roof configuration, depending on arc of about 90 deg, and following the angle made by the portion of roofing and wall in addition to the wind deflector, an could round off the angle of roofing and wall to follow the curve of the deflector, we should go far to convert the harmful vertical currents into helpful horizontal currents.

Stay away from the edges

These findings indicate to me that for more time it will be desirable, and in many cases necessary, to utilize for leading that portion of each wall closest to its center. Here both upward and downward currents are least troublesome. Much close observation of wind placement about buildings confirms the desirability of common sense to stay away from the edges.

This holds true for any type of aircraft, indicates the desirability of a steep approach or take-off along a nearly vertical flight path. Naturally the airplane must closely approach the wind in this type of operation, for

even a machine of very low landing speed will encounter troublesome hazardous vertical currents over the parapet unless its path is steeply inclined from the horizontal.

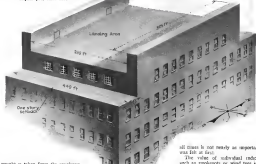
As to the physical composition of the leading surface, it seems likely that the ordinary ship-covered roof is satisfactory from the standpoint of air, the assumption being that all machines for roofing operation will be equipped with pneumatic tread wheels.

Leading loads

The matter of upward loads and the distribution through and supporting structure of the stresses imposed by a leading machine are being given considerable current study. Satisfaction is fast being reached to a tolerable opinion of the arbitrarily calculated maximum of 2 g.

Anyone familiar with antique flying kites that support loads in a good leading line will be usually less than the gross weight of the ship. This aerodynamic paradox is explained by the fact that the rotor of an airplane does not relinquish its lifting power and the load of the ship is supported by the wheels. Transfer of lift from rotor to wheels in the leading, is rather gradual. Even if the wheels seem to squeak the ground with fair impact, they to no mean are carrying the total load of the ship mass into radiation and, therefore, color lift, cannot descend until

Roof into airport. All existing and obsolete machinery is grouped in position along the sides of the White-Orange post office roof.



the weight is taken from the revolving blades. As an example, check airplane thrust in the average airplane leading to no more in great air in the lower layers, the normally full extended air position and the compressed position when the flap is pulled on the ground with the rotor stopped.

Considering the check acceptance nature of this and undercarriage, it would mean that the ordinary type of flat slab concrete construction used in modern buildings should require little additional reinforcement. This construction should also provide adequate wind and fire protection for the building interior. Lighting, of course, presents no particular problem, and the details of leading passengers, mail and express from rooftop to street are clearly within the province of the architect.

During the time when postal authorities and their subordinates were designing the new Philadelphia post office, engineers of the Autogiro Company of America were consulted as to the requirements for a leading airport. Certain recommendations were made, then found to conflict with portions of the design already completed. These recommendations had had to do with the necessary revolving machinery, elevator machinery, and other mechanism of a large building externally placed rather haphazardly in permanent structures about the roof.

A compromise arrangement was de-

vised, placing the revolving equipment on two long pylons some 100 feet apart, the full length of the east and west sides of the roof, and leaving a leading area between with close approaches from north and south.

This suggests the condition of turbulent air in the particular roof, some approaches from east and west must be made over the pylons, some 100 feet above the actual leading area. It is a typical case of an individual condition which must be met by pilot leader with the margin of wind over the area when all-weather operation is indicated. Parapets about 4 ft. high, placed for the north and south walls, presented an obstacle easily overcome by slipping the roof surface at each end to meet the top of the parapet walls. Meeting the roof line about 15 ft. back from the base of the parapets, the slip runs about an angle of 8 deg. from the horizontal.

One experience in leading on the Philadelphia post office roof indicated that the subject of wind indicators to give pilots the exact wind direction is

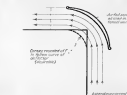
all times is not nearly as important as was felt at first.

The value of individual indicators such as anemometer or wind vane is supported by the fact that different conditions may show within a few feet of them. With the extremely low minimum flying speed of the direct control autogiro it is possible to give wind direction and velocity quite closely by "feel" as all times. Since "direct control" gives an unopposed control at these low speeds, we can remember the machine accurately at all times.

In the case of a roadway "girgir" or a building closely surrounded by other buildings, it is probable that the conflicting air currents would produce an area having pronounced individual characteristics of turbulence. Experience in leading on any rooftop should be helpful in this case, but it seems likely that a pilot preparing to use such an area for all-weather operation would have to rely on the notes on a program of experimental flights begun during a period of fairly calm air. By reporting these such a wind during periods all increasingly rough air, his background of experience should enable him to bring a reasonable operating technique to lead in conditions safely leading.

Emergency landings

Forward leading during a take-off is an ever-present possibility. Until airplanes are developed to the point where "invisible" will give them enough lift to allow them to return to the starting point in the event of motor failure, it



Referred from model studies on the roof of the White-Orange post office, which shows the wind flow over the roof without disturbing the building's structure.

will be necessary to provide small areas immediately adjacent to buildings existing existing airports.

The Philadelphia post office is fortunately situated on the banks of the Schuylkill River, so that a derrick landing immediately after take-off would probably result in a docking, without any necessarily serious consequences for occupants of the machine. The chief danger of the subject will prove of an emergency glide to water during which pilot

and passengers are given time to prepare themselves for a swim by sitting until life preservers.

When no body of water is convenient, small reservoirs or parked areas little larger than the machine themselves may be used. These may, if necessary, be small enough so that emergency landings would leave no element of hazard for the machine's structure, but yet give the occupants reasonable assurance against injury.

AVIATION August, 1931

In conclusion, my landing and take-off from the post office roof was one of the easiest flying jobs I have ever known. Some slight mental hazard may appear when pilots derive their first rooftop experiences but I am fairly certain that this will largely disappear as time goes with familiarity. For my own part, I should almost as readily agree to fly a direct control aircraft from inside a rooftop as scheduled operation as from any other airport.

* * *



Rooftop Airport for New York

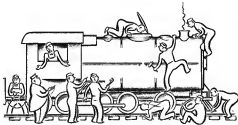
W. Wallace Koffert's proposal would bring air mail directly to post office.

THIS rooftop airport, planned for New York's general post building, would enable through-hour delivery of mail between New York and Philadelphia, by means of a shuttle service to Newark Airport. Then return W. Wallace Koffert, president, Koffert Aviation Corporation, who offered to operate the service if the government would supply

lands for construction of the roof landing area. Plans indicated a charge of 5 cents per half ounce for letters, 3 cents per half ounce for postcards; estimated revenue \$100 per trip (2,000 letters, 30 lb.); income estimated at \$100,000 annually, would be split with the government. After one or two years of testing with mail-passenger service would be

established. Flying time 45 minutes. The plan is a 200x50 ft., would require six to eight months for construction and would cost less than \$1,000,000. Under the Philadelphia roof arrangement, it would be built above the ventilation and elevator passageways. No passengers would be injured. The landing area is already unobstructed.

AVIATION August, 1931



"No exactness of what does not happen in the outdoors... But it does serve with considerable frequency in flying service operations."

21,000 Miles of Charter

Not a bad record for the short New England summer season. But that was last year. Hyannis-Edmonds Airports, Inc., expects to top its record this summer, then pile up more paying time in Florida as it did last winter. Here is how.

By Charles A. Parker

Site Manager, Hyannis-Edmonds Airports, Inc.

IT IS a long walk up to the front end of any section of the Tremont Storage Landing, but we must take you there to explain the meaning of the strange headlines that adorn the page... Imagine the veteran engineer (you have met him in the advertisements) as he sits in his old, rusty, switch in one hand, throttle in the other, awaiting the starting signal. The wheels blow. He pulls the throttle to start the 100-hp. train in motion and nothing happens. Anxious, he looks to a nearby yard hand, who motions another man (you have met him in the advertisements) to the rear of the house. Within a few minutes the conductor is here, a driver then, and everything is motionless awaiting the pusher and propeller, getting nowhere fast.

The foregoing is an excellent example of what does not happen on the outdoors. But does it happen on the scheduled air-line? But it does occur with decreasing frequency in flying service operations, and it must be stopped. A hard boss operator is successful in proportion to the degree in which he closes the gap

that exists between his operating policies and those of the scheduled airlines. Then, he is not here from the roads, we must leave it from them. The remaining is not particularly difficult. All flying is transportation and it is transportation of the highest class, demanding the highest rate of fare. If we don't give passengers more speed, service, and efficiency than the railroads, we are not giving them what they pay for and have no earthly right to stay in business.

In our organization it is understood as a general principle that 10 o'clock departure means 10 o'clock take-off, and not a demonstration in waiting passengers of complex preparations that go on behind the scenes in railroad or airline operations. If a charter ship is not on the line, ready for the warship, then the charter before scheduled departure is not a charter. If no other is available, we have one flying some other operator even if the negotiation involves a loss.

Departure is not the only element with which we are concerned. We re-

gard a charter contract as an agreement to deliver a passenger at his ultimate destination at a specified time. No loss is too heavy if it enables us to preserve passenger faith in flying as transportation. Naturally we cannot control the weather. But we can keep close check on conditions along the prospective route. And if we think we can't get through we notify our passenger in time for him to catch a train, arriving when he wants to get there. Thus, a passenger can reserve a ship, tell us his requirements and forget everything else. He knows he will get where he wants to go when he wants to get there, if not with us, by train. And when we land him there, he finds a taxi waiting at the airport, to take him to his final destination, when at our expense. We do not believe in leaving passengers stranded at the field.

Charter doesn't grow on trees

Charter service is the most specialized form of transportation, the most profitable source of operating revenue. It lies within the means of a very limited

tion and the Ryan ST attracted considerable attention.

Radiators in new design made its appearance, identical with the arrival of the Hummer V (see page 48). The variable Stent Sky Car had been there from the beginning but the presence of both ships on the floor afforded excellent opportunities for comparison. Out on the field there was a brand new low wing take Aeronca.

After the arrival of the private pilots' races, sales reports began to circulate. One manufacturer announced twelve in a single day. Sales totaled over a new business plan devised and operated by the American Flying Corporation. Adopted by several of the manufacturers at the show, it involves a 50 per cent down payment with balance payable in twelve monthly installments. Interest including insurance, is approximately 20 per cent on unpaid balance.

Show-room meetings

What promised to be a session turned out to be an enlightening exchange of ideas when Aeromarine Director Eugene L. Vail sat with light plane manufacturers and designers under the auspices of the National Association of American Builders. To emphasize record by E. E. Porterfield turned the publicity given the light plane program. Vail replied that

he was working closely with it—efforts on the manufacturers. He noted a note that the development work of the bureau would continue, and told of the progress of the design developed for it. He discussed the air-radiating characteristics of the Waterson and Hunsaker planes. A plan to provide ground of engine burner radiating unit for the new ship was also mentioned.

The summer meeting of the Aeronautics Committee of the Aero Club was the most successful yet. Nineteen maintenance superintendents met in round-table discussion of common problems at Detroit's Statler on July 25-26. Chairman Walter Harshbarger (TWA) presided, Fowler W. Barker (A. C. C.) acted as secretary. Present by special invitation: H. Vessels of E. L. M. Co., Harold K. Harney, technical advisor, House Committee of Commerce; J. E. Sullivan, Paul H. Frantz for the Bureau of Aeronautics; T. C. S. Brown, E. R. Lawson, R. L. Montgomery for the Air Corps; G. L. Walker, P. C. Kohnen, and three speakers for the Department of Commerce: E. Paul Johnson (Aeromarine). Three-five representatives of the many factories of airplanes, engines, tools and accessories were on hand for consultation and individual consultation. Next meeting will be in Miami in December.

Pilot license requirements were also

chief concern of travel home operators who underwent the presence of Louis Tresselt, of the Aeronautical Chamber of Commerce, and the chairmanship of Aldo Cipriani. Also the airport manager conference that followed, this meeting was one of a series conducted by the Aeronautical Chamber of Commerce in various parts of the country. (See page 54.) Discussion of the problems of traffic control commenced much of the session at the airport managers, conducted by Fowler W. Barker, of the Chamber with Capt. C. Y. Burnett, manager, Detroit City Airport, chairman.

Invited guests included Don Wilson (Pittsburgh), Thomas Halgen (Richard M. Dedon), L. G. Fort (TWA) and Leslie E. Neville (Aeromarine). Later in the week a meeting of the Boston Air Club Operators was held by F. X. Maca and Jiggs Haffman.

Show sidights

Jimmy Powell had a spare over the longer drive to the field where the Detroit News "Barfield" to cover any suggestion that might turn up Wright (the) Versus the 2nd aged 7 who has and started on landing, took in the show with his dad. The Kencel found a new form of unusual transportation, the Aeronaut, three-wheeled, road-drive, solid operated, had the car. Ray Cooper celebrated his birthday (age not released) at dinner in the tent restaurant. Millions were expected to have attended all day-long program on Sunday ending Taylor cab prospects. J. B. Thomas, of Shop 'N' Home, wanted to lend photo-arts on Belle like his had on quadricycle. He told a cigar butt. At its three custom at border city restaurant, the maintenance men left the country for a party thrown by Tom Cullen. Ben Brothers at his Canadian camp. Service Air Club Operators had a hard time keeping their minds on their own concerns. Next door was a meeting of the Michigan Diving Masters' Association, complete with an auctioneer in Japski's presence.



Looking down the barrel at the liquid radiators Ray combination as it was set up for the tests.

Bigger and Better Radiators

The popular notion that radiators for liquid cooled engines must be made as small as possible has been upset by Wright Field tests. Core areas may be stepped up, drag simultaneously reduced. Controlled airflow by proper coning does the trick.

By Weldon Worth

Junior Technical Engineer, Wright Field



Engine radiator this is the Aeronaut for the test model.



Bendix radiator made an impressive showing along "Hawthorne" line.



A horizontal display of aeromarine was presented by A. B. Adams, Inc.

ALTHOUGH engines may be readily prepared for much speed of aircraft, but liquid cooling, especially at where the radiator will speed up a 400 hp, 180 mph airplane by 1 m.p.h., the same change in a 400 hp, 250 mph airplane would amount to an increase of 30 m.p.h.

The design of radiator becomes very important as airplane speeds go up. In the days of stroke, wire and liquid cooling, radiators and oil coolers contained a portion of the total parasite drag. Now that other coolers have disappeared, however, cooling surfaces must account for much of the parasite.

The power absorbed by a radiator as other coolers, varies with the third power of the speed. It can easily be shown by derivation from basic equation that with the same horsepower the effect of a given parasite resistance

upon the top speed varies as the fourth power of the speed. This means, for example, that where the resistance (or parasite) of a radiator will speed up a 400 hp, 180 mph airplane by 1 m.p.h., the same change in a 400 hp, 250 mph airplane would amount to an increase of 30 m.p.h.

On the other hand, if the speed increase is obtained by an increase in horsepower with no reduction in the parasite, the effect of a radiator will speed up the fourth power of the speed. For example, where the removal of a given parasite will speed up a 100 hp, 100 m.p.h. airplane by 1 m.p.h., the same change will speed up a 400 hp—200 m.p.h. airplane by only 8 m.p.h.

Previously, the selection of a radiator was based upon the old "figure of merit" criterion using the drag and heat dissipation of an uncooled radiator. The radiator was then located in

the airplane at a position where it would encounter a maximum air velocity in order that the smallest possible core area could be used. At first glance, it seems logical to use as small a radiator as possible. It can be proven, however, by theoretical analysis, wind tunnel test, or even careful consideration that this is not necessarily true.

The entirely new radiator must penetrate, and by the Air Corps is 9 in deep. If this radiator core is mounted in a free air stream with no cooling around it, about 50 per cent of the approximating air will go through the core and the remaining 40 per cent will be deflected around it. In other words, it has a mass flow factor of 0.52. The total drag is partly internal drag (due to forcing 50 per cent of the air through the core) and partly external drag (caused by deflecting 40 per cent of the approaching air around the radiator).

First hand experience on the landing of airplanes when the ceiling is down on the carpet and you can't see your hand in front of your face is here summarized by one of the country's outstanding blind-flying pilots.

Zero-Zero

By E. A. Cutrell

TWO SYSTEMS for blind landing of aircraft in radio have been developed in this country: (a) the landing beam system by the Bureau of Standards; and (b) the radio compass system by the Air Corps. The two systems were tested for comparison at Newark Airport during the first six months of the year by pilots on loaded aircraft and under actual fog and low ceiling conditions. Additional tests were made at Floyd Bennett Airport (Long Island), Langley Field (Virginia) and Patterson Field (Dayton). From January 1 to November 15, 1933, 171 completed blind landings and 599 approaches were made at three airports by radio direction, using one or the other of the two systems.

All tests made during the past year by the Bureau of Air Commerce had one objective, (1) to determine the most satisfactory radio equipment that could be installed in most present conditions; and (2) to lay a foundation for the future development of a complete and adequate system for landing under all weather conditions. To obtain the most precise results a Ford trimotor was selected as a representative type of passenger biplane capable for making

the instrument landing experiments.

For the landing beam system (Fig. 1) the ground equipment consists of: (1) a runway beacon or long transmitter radiating beams for visual reference (for directional guidance); (2) a curved landing beam (for vertical guidance); (3) two aerial markers in the approach (for indicating longitudinal distance from the airport).

The indications in the airplane which guide the pilot are: (a) visual and aural; (b) the directional beacons and landing beam are both visually indicated on a combined instrument on the panel (Fig. 2). The markers are constant aural signals transmitted to the pilot through the ear phones as he glides slowly over them on the approach. The center line is indicated on a high patch, the center a low patch. (See "Down the Landing Beam" AVIATION, May 1933).

To carry through an instrument landing under this system at Newark, the pilot arrives in the vicinity of the airport on the Elizabeth radio range, beams turn to the landing beam after crossing the range curtain. He then crosses a 180 deg. turn, flies straight to line it, the landing beam as he approaches from the airport, then changes

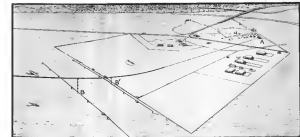


FIG. 1. The Department of Commerce landing beam system as installed at Newark.

The two aerial markers are located at A. The two approach markers are at B and C.

his course 30 deg. for 45 seconds and makes a 210 deg. turn in order to be on the beam after the turn is completed. He then follows the beam using the vertical needle of the combined instrument maintaining 500 ft. at 100 m.p.h. air speed until the horizontal needle gives a level indication showing that he has arrived at the curved path in landing beam.

When this position has been reached he throttles the engine to slow and glides down the landing beam (45 ft. following the directional beam), the path of the gliding airplane coinciding with the pattern of the two intersecting beams when the two pointers on the combined instrument are held crossed on the zero mark. By gently opening the throttle, power is gradually increased in the glide to conform with the curved path of the landing beam as the airport is approached.

Thereafter the pilot would fly the path of the intersection of the two beams until the airplane contacts the runway or landing area. With a single engine airplane it is possible to accomplish a blind landing in this manner, since such a step can be maneuvered readily. The pilot holds the beam course on the directional gyro, checking the vertical indicator of the combined instrument for directional correspondence such as he would in flying on a visual beam. At the same time he uses the throttle to obtain the proper r.p.m. to keep the landing beam indicator slightly above the horizontal level in position underneath until the wheels actually come in contact with the ground.

With the multi-engine transport airplane, however, the process is difficult, considered as it is maintaining the path of the two beams from the point where it becomes necessary to increase the r.p.m. after the glide is begun. Because the shape of the curves of both beams becomes rapidly as the approaching station is approached, the indication on the combined instrument becomes so sensitive that the pilot cannot maintain the larger airplanes rapidly enough to make the necessary corrections of course and altitude. Also in changing the throttle setting during glide to maintain the landing beam path the altitude of the ship is so altered with such adjustment that subsequent corrections for both altitude and descent are not made.

With the Ford airplane a speed of 90 m.p.h. is maintained until the first aerial marker is reached in order to have sufficient speed to maneuver the plane in the two beams. Upon approaching the first marker the engine is set



FIG. 2. The radio compass instrument for visual indication of the landing beam path. The vertical needle shows direction, the horizontal needle, when the follow the beam needles must be held for maintaining the flight controls in that they come in the center of the light.



FIG. 3. Instrument board of Department of Commerce Ford triplane for radio compass landing. Compass indicator and vertical beam indicator used to keep between directional beam and the throttle.

at a slightly decreased r.p.m. to reduce the speed to 80 m.p.h., otherwise considerably more landing area would be required to establish constant and complete the landing. Upon crossing the center marker the plane is held in a constant attitude at descent at 480 ft. per second until contact with the ground with the tail up in level flying position. At this point the most important factor must be maintaining the landing surface. With the rate of speed over rate of descent is determined by the throttle setting. This ratio is altered with different air densities, wind conditions and airplane loadings but these variations can be compensated partially by operating

the throttle properly. With practice it will become possible to determine the throttle setting necessary for landing from the ratio of speed and descent as determined by the r.p.m. in the first part of the approach glide when the power is increased to keep the landing beam path. If engine speed is too great upon arriving at the landing area, either the air speed will increase or the rate of descent decrease with the resultant coefficient. If the r.p.m. is too little, power will decrease or rate of descent increase resulting in a hard impact. In either case this type of contact causes the airplane to leave the ground again. The solution is then gently pulled back to

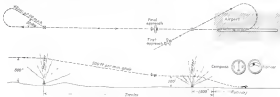


FIG. 4. Layout for ground equipment for the Air Corps radio compass system for blind landings.

bring the tail down in a normal landing position by the time the wheels are again on the ground. The landing is completed by venturing the gyro and applying the brakes to counteract any tendency to turn until stopped.

Radio compass system

The ground equipment for the radio compass system consists of two radio stations established on a line with the approach runway or landing area (Fig. 1). The main station is located 1,500 ft. from the boundary of the airport, and the outer station 9,000 ft. beyond the inner one. Each station has a directional radio compass and a marker beacon as well as high frequency marker beacons so that the pilot will have a visual indication when passing directly over the station. The outer station station is usually established in a high peak and the inner a low peak, thus each is readily identified aurally.

Radio compass indicator and marker indicator are connected to the display. The compass indicator is vertical (or not) when the airplane is headed directly toward the station to which the display is tuned. The marker on the marker indicator uncovers a light when the airplane passes through the beam of the high frequency marker directly over the station.

In making directional readings with this system at Newark, for example, the pilot tunes to the frequency of the inner station upon arrival on the radio beacon, and also the field (D) radio for his sensitive altitude correction. He keeps the radio compass indicator centered until the marker indicator shows that he is over the outer station. He then flies a course 36 deg. from the compass course of the approach over the two stations for 45 seconds, makes a 215 deg. turn and approaches the outer station away from the airport, returning to the frequency of the outer station upon reaching the outer field. Here the gyro is set to 150 deg. between the two stations, the pilot then altitude to 300 ft. and flies the compass indicator at zero at outer parking and the marker again flashes over outer station. By flying between the two stations with one compass indication, an estimated drift may be obtained by reading the degrees difference on the gyro. A "driftless" of half this number of degrees would then correct for wind drift as making the approach. Upon joining the marker from the outer station the pilot again turns off 36 deg. toward for 45 seconds, makes a 200-deg. turn and is then aligned with the two stations for the landing. One or two turns of the indicator should be set for full scale deflection when 60 deg. from the station. The pilot then throttles the engine for level flight at 100 mph, after 2 min. is completed. With the Ford upon joining the marker indication over the outer station the out-

board engines are throttled to 1,300 rpm and the motor engine is idling. The compass is then returned to the center frequency, and the altimeter lowered to indicate the altitude for a power glide at 80 mph. The engine rpm will drop from 1,300 to 1,150 as the speed decreases from 80 to 60 mph. As airspeed, the rate of descent is about 500 feet per minute to smooth as the glide commences.

Glide control

The technique of control in the glide depends largely on the pilot's ability to set the rpm correctly and to hold it, at the same time maintaining a constant attitude for the ship energy descent until the inner radio altimeter is reached. On the Ford, at 200 ft. just before the altimeter is given to drop the altimeter reading between 150 and 200 ft. and the air speed between 80 and 85 mph. This is obtained by increasing the rpm of the motor engine, lowering the controls as far as the glide.

The compass indicator should be flown in the proper position with reference to the air past to make the necessary corrections. The gyro on the compass should be checked at the beginning of the glide as soon as the outer station is properly noted, and, more than that, it must be readjusted. During the glide this course should be checked for error at most than 5 deg. while the station indicator is maintained in the center position. Landings should be completed only when the altimeter on the compass is less than 5 deg. Upon crossing the outer station at 150 ft. the direction of the compass should be checked at the outer station and contact is made with the ground. In order to lessen the impact at the 80 ft. per minute descent the bar on the horizon should be centered level position at 100 ft. With the outward engine of the Ford at 1,150 rpm, flying level will result above 80 ft. with the airplane in level flight as indicated by the horizon bar. At 80 ft. an indication on the sensitive altimeter the bar is gradually pulled up by gentle pressure on the column control, so that the ship upon contacting the ground will be near a three-point landing attitude. After contact is made the altimeter should be gradually pulled fully until all the way back and direction maintained by using the brakes on the directional gyro until stopped.

Results, recommendations

As a result of the experience as far as ground from making a great many landings with the Ford, transport under a wide range of conditions using both the beam and compass landing system certain general conclusions may be reached regarding the relative merits of the two systems. The beam is simpler and requires less equipment for field landings. They are not all-inclusive, but are here

set down as a part of the record of a long and intensive research program.

1. The use of a beam for directional guidance in the approach for a landing has not been as satisfactory as the radio compass. With a beam (visual or aural), a pilot must solve a continuous problem to obtain his directional heading or course. He must study the transmitted signal first on one side of the course correction, then on the other, and calculate the heading as normal duty, as a compass or directional gyro. Inasmuch as the calculated heading may change during descent (due to changes in wind direction and velocity and variations in the plane's speed), this calculation must be made continuously from the time the approach is started until it is completed. With a large, heavily loaded, multi-engine aircraft it becomes very difficult to continue the checking of the course the last few thousand feet of the approach due to the sluggishness of the engine mechanism as compared with the heading signal of the beam five miles back. Unless the course has been definitely established before the glide, and remains constant until the end of the approach, it is usually difficult to re-determine a heading when in the glide for an approach.

With the radio compass, on the other hand, the heading of the airplane is obtained directly on the instrument. There is no mental calculation required to determine the course to be flown. With practice the pilot corrects the course in the center of the compass in the early for error indicated in his flight instruments. As he approaches the transmitting station the course indicates a slight deflection of the compass needle. If he is off course 5 deg., the position of the hand will be the same whether 1,000 ft. or 5 miles from the station.

With the radio compass the possibility of reference beams at the ground with a radio range station is eliminated. A pilot makes a landing successfully by consulting a signal that is in direct relation with the indicator system in the direction the airplane is heading. Therefore, the radio compass should be considered a necessary part of the transport airplane's radio equipment, and the radio aids provided for the approach and landing in conditions of low ceiling and poor visibility should include equipment for directional guidance by radio compass.

2. It has been concluded that instrumental heading is regular practice will require a specially designed landing gear that will absorb the shock of contact with the ground without rebound. A landing gear of this type will be required to eliminate ground looping or bouncing tendencies.

3. Present airport landing areas are not adequate for deposits in heavy wind conditions. Approaches must be free of obstructions.

Out of Bounds Again

WHEN we put out a while back to sweep a few pointers with the extended advice of *The Aeroplane*, we took it on pretty much as a bit of good, clean fun, a sort of friendly sparring match to work up some helpful periphrasis for both sides, and with no aim at anybody's nose. Apparently we were wrong. Apparently, too, we have made a few very open spots, for C. G. Grey and some of the other literary hulk struts the water are showing unsavory signs of getting serious about the affair.

To dredge up and display, with apparent editorial glee, in *The Aeroplane* an anonymous article on the unfortunate KLM accident at Rothen Wijk last December seems just a bit out of bounds. The unknown who wrote it implies that he has inside information by using the pseudonym "Netherland." This entering gentleman, although he admits to only "a couple of short flights in the Douglas" apparently knows all the answers. According to him, the Douglas is positively uncontrollable in anything but a dead calm, and can't be taken off or landed in any but a 360-deg. approach if there is even a breath of air strong. To attempt to fly one in bad weather seems to him positively suicidal, "hardly outweighed by the delightfully comfortable chairs and a cabin that is less noisy than the average train."

► Flying conditions in Europe seem indeed to be extraordinary. We have personally found a good many boats and some thousands of miles in Douglas. We have been on the roughest sort of country in Central America, in and out of small airports from 100 to 7,000 ft. in temperatures ranging from the tropics to below freezing. We have crossed the Rockies and the Alleghenies in fair weather and fog, day and night, winter and summer, in Douglas. We have flown in Douglasland owned by at least five separate companies, down by dozens at different points, human and robot, and we must confess that we have never seen the alarming phenomenon described by C.G.G.'s expert. But if we had never even seen a Douglas crash, a glance at the astounding record for safety set by U.S. airlines dur-

ing the last half of 1935 would be endless enough. Since \$5,000,000 scheduled passenger miles flown per passenger fatality is a figure never before approached here or abroad, and a large share of that total was contributed by Douglas airplanes. With all due respect to the gallant gentlemen who died at the controls outside of Rothen Wijk, fighting a weather condition that was simply beyond their abilities, we feel certain that wherever the fault may have been, it was not with the ship.

► Other voices have been joining the chorus under the Grey banner. Louis Bergan, in the current issue of "Pilot Call"—a magazine organ extraordinary of the Greater-Brother Group—goes to lengths somewhere beyond the limits of strict accuracy in comparing the characteristics of the Martin Bomber and the Bergan 608. Whatever the accuracy of his figures for his own machine, apparently his intelligence department misinterpreted him rather badly on the Martin performance. He must have been unfortunately close to being sent hither to the American embassy to have been forced to such tactics.

Our own aviation industry needs foreign markets. It not only does not receive the direct assistance given foreign exporters by their governments, but must do what it can in the face of indifference from some branches of our government and neutral hostility from others. We shall continue, as usual and out, to support in every way possible any honest efforts to promote sales of aeronautical materials abroad by offering superior products. Potential customers can get their supply of propaganda and of gossip and rumors about competing products from some other source. The American industry can afford to rest its case upon possible fact, and fact alone.

Control or Segregation?

BEFORE many years have passed the problem of traffic congestion at airports is going to become acute. Already it is causing consternation at the lesser terminals, and there are many conflict pilots who would rather do almost anything but land a private airplane at Newark, Cleveland, or Chicago.

Editorials
AVIATION
REYNOLD F. WATSON
Editor

The solution may be a compulsory standardized traffic control with regulatory tents. Or it may be in the segregation of activities, leaving certain types of flying at the busier airports.

Traffic control requires continuous service of trained tower personnel, which costs money, and at least a uniform visual signal system. The ideal air-traffic management would require all ships to carry two-way radio equipment but this will be impractical until the cost of communication apparatus is unacceptably reduced. If activities are to be segregated the distinction should be drawn between instruction and transport flying including charters. It is an unnecessary to prevent the fixed base operator from feeding passengers to the transport terminal as it is dangerous to mix student with transport.

If segregation is to be adopted within a few years, there is no time like the present in which to build the additional fields required with funds from Washington. Money for that type of relief work may be much less plentiful a year or two from now.

Regardless of which solution is accepted, legal legislation will be involved. It can be good, but it may be bad if the industry sits back and relies on Congress or some other governmental body to do the job.

The Bureau of Air Commerce is ready and willing to evolve and reform any set of regulations that are logical and satisfactory to the airport owner. The Aeronautical Chamber of Commerce has given this question an important place in its agenda for this year's regional airport conferences. These meetings are being taken to the airport managers of eight key districts to facilitate attendance. Four have been held already in Washington, Boston, Detroit, and Kansas City. Four more are planned for Portland, Ore., San Francisco, Los Angeles, and Birmingham.

This arrangement leaves little reason for anyone to miss his district conference. Airport managers and others interested should take active part. It is only through cooperation that it will be possible to arrive at a mutual understanding to the owners and operators of the airports and to those who use their fields.

Let's Have More Soaring

TWO EARL SOOTHIE, and to the directors of the Soaring Society present this year at Elkhart, an orchard for their able handling of a situation that was an uphill battle all the way against natural and economic odds. The loss of Warren Eaton was keenly felt—but in spirit he was carrying on—in the memory of those with whom he had been so closely associated, and in the greatest support given by Mrs. Eaton and the members of his family.

Closely, however, the immediate future of the society, (and of gliding and soaring in America), will

depend upon the quality of the leadership displayed by its officers and directors. It is our earnest hope that they may be able to secure adequate private or governmental support so that soaring development can soon be put on a permanent basis. Here is an opportunity for some far-seeing individual or organization to step forward and sponsor a project whose potential contributions to aerodynamics and aerobiological research are enormous.

Main Street Airports

TWO MINUTES LOST waiting for a red light to change on the way from the airport into town has just as much effect on the speed of an air journey as has a drop of 3 miles an hour in the speed of a modern transport plane on the average passenger trip. The airlines have done wonders in saving minutes in the air and in loading and unloading, but no one has yet done very much about the 20 to 30 minutes lost at each end of the journey.

Best solution for aviation's worst remaining problem of practical utility would be to get between airports, but with ever-increasing mingled head values and more stringent saving laws in the offing, few cities can look for the answer in that direction. Next best is to find speedier means of travel from the airport to the city. New York's plans for airplane shuttles from the airports to airplane ramps fairly as the business district offer an encouraging possibility that many water-front cities might imitate.

The airplane offers another possibility. Like many machine projects that have been subject to theoretical analysis but has never been tried out in practice, the idea of landing aircraft on rooftops has long been a subject of heated discussion. Elaborate architectural drawings showing huge (and obviously costly) structures supported on the tops of skyscrapers in New York, London, or Paris have been tossed out by the score. It occurred for the airplane people to stage the first practical demonstration of what can actually be done. Harold Phipps, Wallace Kellert and others have long since been interested in the idea, first realized with the demonstration last month of landing an airplane on the roof of the Post Office in Philadelphia. Elsewhere in this issue will be found not only a study of the problems incident to the actual landing and taking off from roofs by James Rex, one of the two pilots who participated in the test, but also something of Mr. Kellert's conclusions on the economics of roof-carrying by airplane.

We have often argued that airplanes and other new types of aircraft are entitled to be considered on their own merits to do their own particular brand of work, and to escape treatment as a special sort of airplane having to do exactly the same things the airplane does. Shunting to rooftops certainly appears to be a job not out especially for rotor aircraft.

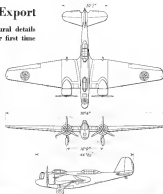
Flying Equipment

Martin Bomber for Export

Released for foreign sale, structural details of B-10 bomber are available for first time

AS STANDARD EQUIPMENT for Air Corps bombing squadrons, the Martin B-10 has been taken here apart on the sheet list and its details with built from publication. Now, however, that the Army has passed on to improved types, permission has been granted to sell the B-10 abroad, and it is possible to present for the first time critical of the structural features of this machine.

First, a word about performance. Standard power plant for the B-10 consists of two SAE-1420-538 Wright Cyclones, rated at 750 hp at 1,350 r.p.m. at 5,400 ft. These engines have a compression ratio of 6.4:1. Master gear ratio of 8.37:1, propeller gear ratio 16:1. They propel three-bladed metal propellers 31 ft. 3 in. in diameter. With normal load the gross weight is 14,192 lb. In this condition the ship shows a high speed at sea level of 246 m.p.h. at 4,500 ft. 213 m.p.h. at 10,000 ft., 213 m.p.h. Service ceiling on both engines is 25,000 ft. on one engine, 20,600 ft. It takes seven minutes to climb to 10,000 ft. In the maximum overload condition (gross weight 18,652 lb.), the load range is 25,000 ft. (average 176 m.p.h.) in 1,450 miles, at 14,000 ft. (average 170 m.p.h.), 1,300 miles. At 14,000 ft., average 200 m.p.h.



Martin B-10 bomber in flight over the Washington Field.

Right: Engine mount and main landing gear assembly. Wheel fairing that slides which extends down lower end of landing struts during takeoff and retracts after landing.



Left: Tail wheel assembly showing method of attachment to rear fuselage. Includes also control connections to elevator, rudder, and ailerons.

in the center were modified to fit the fuselage. The oil tanks, each of 35.5 gal capacity, are mounted immediately behind each engine in the fuselage. For special long-range work, an additional 250 gal gas tank may be installed in the bomb bay.

The D-10 bomber is intended for a crew of four or five men. The bombardier (who manipulates the bomb sight) also the forward machine gun, and the pilot are in the nose section. Immediately behind the fuselage, space is provided for the radio operator who acts also as navigator. As it was in the rear cockpit, the two cockpit are connected with machine guns mounted both above and below the fuselage, also functions as a relief pilot with a set of controls, centrally mounted in the rear cockpit, which may be shifted out of the way when not in use. There is room for a fifth man who may be flight commander, navigator with the radio operator. The front and rear cockpits are connected with sliding transparent enclosures. The bombardier is protected from the air stream while manipulating the machine gun by a transparent "hardpan" screen which may be easily raised or lay down direction. Naturally the bomb load is carried completely housed in the center section of the fuselage. A part of the tail fin is in the bottom of the bomb

able propellers, wing flaps, or almost any desired arrangement of armament. The movable nose of control and its facility at maneuvers of the Martin B-10 has had much to do with the outstanding position now occupied by this machine. During the second flight in Alaska in 1934, and in the subsequent severe stresses of the GHQ Air Force, the B-10 has amply demonstrated its ability to absorb punishment.

P&W Ratings

Engine company revises policy for engine ratings

Since engine performance rather than full power performance is the criterion for airline operation, the Pratt & Whitney Aircraft Division of the United Aircraft Manufacturing Corporation has adopted a new policy of "cruising rating" to bring its engine specifications more nearly in line with actual requirements.

In addition to the new ratings, announced has been made that considerable increase in take-off power is now available in all engine models. High output at take-off is necessary because of the generally high wing loadings on present day transport designs, and to meet a demand for high propeller thrust at take-off for rapid acceleration. All stressed parts of the engines have been redesigned to permit exceptionally high outputs for short periods of emergency operation. Engines in current production have also been modified to take the recently announced Pratt & Whitney automatic mixture and power control and the Hamilton Standard constant pitch propeller device. Automatic mixture gear lubrication is now standard equipment.

The revised ratings for the current production models are given in an accompanying table.

New P & W Engine Ratings

Engine	Take-Off	Normal	Standard	Take-Off	Normal	Standard
Model	1000	1000	1000	1000	1000	1000
Take-off power	400	400	400	400	400	400
Cruising Rating	300	300	300	300	300	300
Cruising at P 10	2500	2500	2500	2500	2500	2500
Maximum Airspeed (ft)	5400	5400	5400	5400	5400	5400
Maximum Power	600	600	600	600	600	600
P 10	2300	2300	2300	2300	2300	2300
Propeller Size	40	40	40	40	40	40
Propeller Pitch	1.5	1.5	1.5	1.5	1.5	1.5
Base Weight (lb)	300	300	300	300	300	300
Weight (lb)	400	400	400	400	400	400
Propeller (lb)	40	40	40	40	40	40
Propeller (lb)	40	40	40	40	40	40

Note: Maximum engine speed 2100 rpm. *Data available for comparison only. †Data available for comparison only.

New Wright Whirlwinds

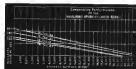
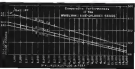
Revised Model E series incorporates many features of F-50 Cyclones.

Five years after three Wright Whirlwinds have been known wherever propellers have turned. Colonel Lindbergh flew one across the Atlantic. More recently the Kings brothers stayed over 500 odd hours in the air behind one. Soak Eastern Air's new fleet of Electras will be running off their daily schedules with Whirlwind power. But the latest of the series are the revised from the 1930 prototype or from the Speed of St. Louis power plant of 1937. They now appear in new form, four seven-cylinder models and three sizes, all but one supercharged for altitude performance, all incorporating the latest design features improved originally for the F-50 Cyclone (Aviation, June, 1935).

Power ranges from 250 to 450 hp (at take-off). All engines in the series are fundamentally alike, have some 90 per cent of parts directly interchangeable.



Typical of the new Series E, Whirlwind the new cylinder model with revised exhaust manifold.



able. Model numbers and power ratings appear on accompanying charts.

Except for the F-50 Cyclone built primarily for U. S. Army training planes, all Whirlwinds are equipped with a supercharger of the centrifugal type, geared from seven to ten times crankshaft speed. A centrifugal boost type clutch is mounted in the drive to take care of sudden acceleration.



New centrifugal boost has been lengthened to provide better propeller torque during Wright Whirlwind engine use and time applied.

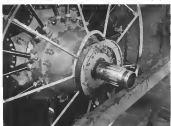


Details of latest Whirlwind cylinder, valves and pistons. Note slide cylinder exhaust port.

Cylinders are of the usual composite type with steel barrels and aluminum heads. More than 500 have been provided, and, at some sacrifice of initial weight but at the interest of maintenance economy, the wall thickness of the barrel has been increased to permit two re-grades. Full pressure baffles have been provided for efficient cooling. Each baffle is individually detachable, permitting the removal of any one cylinder or any group of cylinders without closing down all baffles. Interesting feature of the new cylinder design is the side opening exhaust port to permit the use of either front or rear exhaust manifolds.

Pistons are machined from aluminum alloy forgings. Two types are offered—one with 3:1 to 1 compression ratio with concave bowl, and a 6 to 1 compression ratio with flat bowl with compression in top to clear valves.

Particular attention has been paid to the oil tightness of the engine. The two



The Quick propeller brake as applied to a ground driven engine on a S-42B for Pan American.

Propeller Brake

Pan American adopts Quick device for S-42s

For many years there has been concern that there are occasions when the complete stoppage of one or more propellers on a multi-engine ship would be distinctly beneficial, but such very recently as we have advanced any practical method. As a result of first trying a number of large airplanes (which is a part of his job as engineering inspector for the Bureau of Air Commerce), Lawrence B. Quirk gave serious thought to the problem, designed a propeller braking device, obtained basic patents, and collaborated with Sweeney Aircraft and Pan American Airways in applying the device to an S-42. The S-42s now in production are also being fitted with the brake.

Chief advantages of elimination of "windmilling" or idle or ineffective power plants are (a) the normal landing—refinement of technique caused by propeller wash over section of wing adjacent to power plant (fresh counter air, higher lift, lowered landing speed, better control); (b) after engine failure, reduced turbulence and elimination of vibration from dead engine (usually marked improvement in control during sustained flight with remaining engine, no depression or abnormal vibration movements from a windmilling power plant). Also if engine failure is caused by failure of a part, the propeller may be stopped at once, possibly preventing complete destruction of the engine, or the leakage of other expensive parts.

The layout of the brake system as now installed on PAA's S-42 is shown in the diagram. Complete installation

for four propellers weighs only 55 lb. Oil is pumped from a two-quart tank (a) by hand pump (k) through check valve (s) into accumulator (d) to oil reverse pump (c) in check-off valve (f). Pressure is increased by the pump and maintained in the accumulator which has a capacity of 2000 lb. per sq. in. Between 1200 to 2000 lb. is required to operate the brake. When the check-off valve (f) is opened, the oil passes through the main line to four control valves (l, e, j and g) which may be opened to operate the brake singly or collectively. When a valve is opened oil passes into brake cylinder (g) connected to the engine nose section. Each cylinder contains two pins and oil proof pistons, which, under oil pressure, move keyholes into brake bands against the brake drum (h). Spring (i) returns the pistons to a normal position, when the oil pressure is released. The brake shoes are shockless castings. Drums are machined from steel forgings and are provided with cooling fins.

They are connected to the nacelle bolts on the (three-way) propeller by means of welded steel brigs.

although this naturally depends upon the equipment installed by the individual purchaser.

Some idea of the structure may be obtained from an accompanying photograph of the unpowered auxiliary. Welded steel tube is used throughout fuselage and mid members, wing spars and ribs are of wood, covering, fabric. The stabilizer is fixed with respect to the fuselage, but convertible into a slotted airfoil in the rapid type with all leading edge taken by large Goodyear Air Wheels. Leading gear struts also serve as part of the wing bracing system. Wheels are enclosed in large streamlined pods.

Cockpits are arranged in tandem with a sliding transparent canopy over both. Other cockpits may be completely uninstalled on the ground or in the air.

Power plant is a Menasco six-cylinder, supercharged Encasement of 208 hp. The two-bladed propeller is fitted with a larger spreader which gives the desired form of the nose of the ship, characteristic of Brown design. The first ship is being fitted up with two



gyro radio and a complete set of Kollsman instruments

General specifications include: span, 31 ft. 10 in.; length 25 ft. 10 in.; height overall 8 ft.; wing area 130 sq. ft.; weight empty, 1,650 lb.; gross weight, 2,500 lb.; wing loading, 15.3 lb. per sq. ft.; power loading, 11.5 lb. per hp.

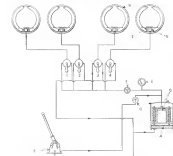
Shown details of the S-42 fuselage and landing gear. Both wheel and main gear are of the completed ship.

Fast Touring Plane

Race designer producing commercial type with Menasco power

Lawrence W. Brown, well-known whenever race enthusiasts frequent the design of such outstanding ships as Lee Miller's "Special" and Roy McLean's "Miss Los Angeles," has at last been applying racing principles to a two-place commercial airplane for the private owner who wants to go places in a hurry at reasonable flying cost. The first of the new ships has been ordered by a Los Angeles pilot and will probably have been test flown and delivered by the time this issue goes to press.

The Brown B-3 monocoque is one of the new U. S. designs which has taken full advantage of slots and flaps to extend the speed range. Although top speed is calculated at about 200 m.p.h. (maximum at 180 m.p.h.), the slot-flap combination is expected to bring the landing speed down to about 40 m.p.h., giving the extraordinary ratio of 2 to 1. The cruising range is to be in the neighborhood of 1,000 miles,



Layout of the propeller brake on an S-42B. (For test for key to parts.)

great telescopic jack and bearings on previous models have been replaced with a one piece construction similar to those of the Cyclone. Sealed with a gasket gland at the roller base and a one type construction at the endwise, they are thoroughly of sight. Further oil control has been attained through the use of piston ring type oil seals to replace the leather seals previously used on inboard shafts and at crosshead driven bearings. Baller contact between crosshead guiding flanges prevent leakage at each point. A Gano pilot-disk type oil filter is installed in

standard equipment for all new models. Crankcase and accessories driven have been strengthened to provide the strength needed to handle the higher output.

Other features of the engine follow most Whorlessen pattern. Ignition is from two Scintilla magnets mounted on the rear cam, fuel from a single barrel Stromberg carburetor. Compression regulator or pressure and release is furnished in standard equipment. The latter carries the endorsement of the Fire Underwriters' Laboratory, as an efficient backfire trap.

Ten-Lens Camera

Fairchild makes largest aerial camera for survey work

A compact aerial camera, built in two five-lens Fairchild cameras, has just been announced by the Fairchild Aerial Camera Company. One camera is set at an angle of 45 deg. to the other, so that the two prints secured by tripping the shutter chamber overlap to make an octagonal composite picture covering an area of 700 sq. ft. from an altitude of 30,000 ft. First project on which this equipment is to be used is to fill a contract recently placed by the Soil Conservation Service of the Department of Agriculture for an aerial survey of Central New Mexico. This job is scheduled to be started about the middle of the summer of 1935.

Although the cameras themselves are the standard Fairchild five-lens units, widely used for military and mapping surveys, the mounting of the two units on a single base and the re-mounting



Typical installation of Western Electric Electric code equipment for the private owner. Above is the new Model 12-A transmitter, below the 12-A receiver.

ing weigh 70 lb. include 1,200 ft. of film, or sufficient for 2,600 individual photographs, 280 composite photographs. Each set of ten overlapping prints secured at each exposure covers 42 sq. spaces.

Radio Transmitter

New private owner equipment by Western Electric

Used directly at the private airplane owner's work is a compact radio transmitter, lately designed by the Bell Telephone Laboratories for Western Electric. It is a companion piece for the two-band 11-ft. double-tube receiver (12-A) recently announced by the same company. Both parts of equipment show up in the photograph accompanying.

The new Model 79-A transmitter operates from the standard 12-volt battery with high voltage for tube plates supplied from a 300-volt dynamo, also operated from the battery. It offers three types of transmission, voice, tone telephony (with complete

modulation, output 5 watts), and continuous wave telephony (output 15 watts).

Frequency range covers the band between two and seven megacycles. Frequencies are crystal-controlled. Any two within the allowable band may be selected by merely starting the proper crystal and adjusting a single tuning control. A two crystal unit is available which enables transmission on either 3,000 or 5,120 kilocycles, frequencies assigned by the Federal Communications Commission for working with Department of Commerce commercial airlines or non-commercial airports. Change from one of these frequencies to the other is controlled by a small switch on the front of the transmitter panel.

Only one tube is used in the transmitter, both Western Electric No. 307-A, a recently developed power pentode type. The first acts as a crystal controlled oscillator, the second either as an amplifier, a modulating amplifier, or a modulating amplifier and voice frequency oscillator, depending on the type of transmission being used.

The transmitter alone weighs 11 lb., occupies 45x10x6 in. The receiver is sufficient for the 79-A transmitter and the 12-A receiver, complete with dynamo power supply, runs about 46 lb.

Big Boeing Bomber

Preliminary reports on new military craft indicate high performance

IF ONLY HALF the rumors are true, one doubting about the new bomber to be demonstrated to the Army at Dayton when tests are opened on August 22, the military people are to be as



Aircraft built details at Boeing's new assembly building are taking the photographs taken during Boeing Air the latest flights at Boeing Field show more fully at the appearance and general characteristics of the ship.

convinced experience. It is certainly safe to predict that aircraft offered under the new specifications will far and away outperform anything in their class ever before available in this or any other country. It is known that at least three outstanding manufacturers have steps ready to demonstrate their craft as to what may be expected under the form of a preliminary release from the Boeing Company.

The Boeing 299 Bomber 3-in. in general, as all noted, has wing monoplane, apparently deriving from experience gained in the building of the 247 type monoplane. Span is approximately 100

ft., length 70 ft., and gross weight is in the neighborhood of 30,000 lb. Four Pratt & Whitney Hornet engines rated better than 700 hp. each, averaging 1,100-hp. Standard three-bladed constant speed propellers furnish the power. The ship is said to be able to carry on any of the specified maximum with full military load with one engine inoperative. Nothing is known of its actual performance, but it is said to meet or to exceed all specifications laid down by the Air Corps, which include top speed between 250 and 254 m.p.h. at 10,000 ft., cruising speed at the same altitude of 170 to 220 m.p.h., a range at cruising speed of from six to ten hours and a service ceiling between 30 and 35,000 ft.

Structural features appear to include typical Boeing semi-monocoque fuselage with long-tapered, rib-reinforced, built-up and smooth outside metal skin. Wing is also very likely of typical Boeing construction. Apparently flap gear is included to reduce landing speeds.

Nothing is known of the armament but it is assumed that antiaircraft and anti-aircraft equipment will include automatic pilot, two-way radio telephone equipment and a radio compass.

Plymacoupe Again

Further details on Plymouth eagle conversion

ALTHOUGH the complete story of the work done to adapt automobile engines to aircraft has cannot yet be told, further details of the Plymouth engine conversion for use in the Fisher Ply-



Complete aerial camera. The Fairchild compound lens camera with eight 110 sq. ft. of ground in a shot from altitude is visible.

of the shutter system require great care and exceptional accuracy. The frame-work on which the cameras are assembled consists of a heat-treated aluminum alloy casting, especially designed and finished with great precision. The same limits of accuracy are necessary on the mounts for the other elements of the camera. The mounting frame alone weighs only 85 lb. and the

complete unit assembled without film weighs 225 lb.

The two shutters are operated simultaneously by an electric signal from a single teleprinter control box. Should any shutter fail to function properly, a small Neon light signal flashes automatically to call attention of the failure to the operator.

The two rolls of film for a single shot



Known required to convert Plymouth automobile engine for aircraft use are: structure, fuel, 12-volt battery, and other details of the Plymouth engine conversion for use in the Fisher Ply-

cope (August, June-July), arrive from race to race. Latest information comes in the form of a release from the Chrysler Corporation indicating that the engine has successfully completed the required 50-hour out-of-construction full load operation. The engine "scratched by" at 355 hp (slightly less than the standard automobile engine), developed a maximum of 33 hp at 2500 rpm.

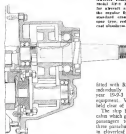
In aircraft form, the engine is basically the same as the other units produced by the Plymouth division. Principal changes are the removal of the flywheel and the substitution of a geared propeller drive unit, installation of a Genetec "Vortex" magnet in place of the regular distributor head, removal of the radiator fan, installation of an exhaust collector and steel metal exhaust manifold. A cast aluminum cylinder head saves some weight, boosts compression ratio from the usual 6.7 to 7.0. The gear box, full pressure lubricated from the main oil pump, gives a maximum propeller speed of 1500 rpm for a crankshaft speed of 2500 rpm.

Officials of the Chrysler Corporation report that great interest has been evidenced in this engine race by automobile men throughout the country. Over 4,500 inquiries have been received from people in this country and abroad who are interested in obtaining complete power plants for their aircraft.

Argonaut Amphibian

Monsoon powered, amphibian priced, for general private owner use

From the North Tanagera (N. Y.) plant of Argonaut Aircraft, Inc., comes word of production plans for the Argonaut amphibian, a three-place all-purpose ship, designed for the sportsman pilot. Although the square off



line of hull and wing may not be quite as appealing to the eye as those of some of her more expensive counterparts. They obviously lend themselves to economical production and straightforward engineering—elements that are important in the market segment which this airplane is obviously aimed.

The hull is of a semi-monocoque type built of wood with fibreglass spray-on hullsheath, connected longitudinally by spacer stringers. Top bulson and sides are plywood-plated, the whole fair-vented and clipped. The cabin enclosure forward is steel tube framed.

The wings are of Clark Y section, extremely braced, with spars and plywood ribs. Leading edge is plywood reinforced, the whole in fabric covering. Tail surfaces are steel framed, fabric-covered.

Landing wheels retract by means of a simple crank mechanism, sliding back against the sides of the hull in the low of flight. Control is from a wheel under the pilot's seat. Wheels are



The Argonaut Amphibian comes from North Tanagera, N. Y. It is powered with Monsoon G & E four-cylinder.

Selective seating designed by the Bendix Aircraft Company for application to the Model 19-B Pipercraft amphibious engine for aircraft use. This seating system, the regular Bendix, looks as if out of modern aircraft. Even so it is of the same low reduction. It is fitting in of cost standard only. All features by B.E.P.

filled with shock shock absorbers and individually operated brakes. Good-year 15-0-3 Airwheels are standard equipment. When about the wheel are held close of the wheel.

The ship has a 34 in beam at the cabin which gives ample room for three passengers to sit side-by-side. The three passenger-type seats are arranged in staggered fashion, two ahead, one aft. Dual controls are fitted at the outboard seat, the right-hand set being quickly removable. Cabin windows are of plastic. Cabin heating and ventilation also supplied. Storage compartments are located behind the rear seat and in the extreme bow. Standard equipment includes usual engine and navigation equipment plus anchor, navigation lights, wobble pump, engine drive fuel pump. The power plant is a standard Monsoon Prime C-4, four-cylinder inverted engine, delivering 125 hp. It is mounted as a pusher on steel tube struts above the cabin section. It drives a flat-shaft four-bladed metal-tipped wooden propeller.

General specifications include span, 32 ft 4 in; length, 26 ft; height overall, 8 ft 2 in; wing area (Gullwing silhouette) 185 sq ft; weight empty, 1,100 lb; useful load (including pilot and two passengers, 100 lb of baggage, 200 lb of provisions, 20 lb of oil, 200 lb; gross weight 1,500 lb; wing load, 10.63 lb per sq ft; power loading 15 lb per hp.

(Continued on page 37)

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AIRPLANE WHEELS •
BRAKES • PILOT SEATS
AND PNEUMATIC
SHOCK STRUTS

THE BEACON OF AVIATION SAFETY

BENDIX AIRPLANE BRAKES for Hydraulic Operation



OPERATING CYLINDERS
For HYDRAULIC BRAKES
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Texaco Airplane Oils are carefully refined especially for aviation service. They are remarkably pure and always uniform in quality. Their unsurpassed dependability in maintaining pressure under all sorts of flying conditions is a safety factor you can't afford to neglect. They are economical to use because their resistance to sludging and low contents of carbon-depositing elements reduce the expense of overhauls.

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SAFETY

—The most vital factor in aviation depends upon engine performance, and engine performance depends on the oil you use.

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—Planes in the air are the ones that earn profits. Texaco provides the most lubricants that will lessen time on the ground.

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PRODUCTS

★ TEXACO MARFAK ★ TEXACO
APRONS AND DUST LAYING



THERE IS AN EXTRA MARGIN OF SAFETY, SPEED

AND ECONOMY IN TEXACO AVIATION PRODUCTS

With Foreign Builders

Military models predominate in the recent production of overseas factories

The French point with particular pride to their latest achievement in fighters, the Dugout 450, a large low-wing monoplane carrying two Gnome Rhone K-14 radial engines in outboard nacelles. Speeds in the neighborhood of 230 m.p.h. are claimed for this machine. It turns banks with banking gear fore and aft, above and below. The fuselage is very deep and the two pilots are in abutment all in covered cockpits high up on top. The landing gear is retractable. Another example of the French builder is "l'atmosphère de combat," the Potez 54, a high-wing two-engine monoplane. This machine has a large staggered fuselage with pilots seated side-by-side in a covered cockpit just forward of the leading edge of the wing at the center section. The two engines, either Gnome-Rhone M Keta or Hispano-Suiza 12-30s, are hung in separate nacelles below the wing.

Britain's Royal Air Force display brought out a host of new bomber prototypes apparently all built to a common specification. Bristol and Handley Page designs (Bristol Type 130, two 680 hp Bristol Pegasus XII engines; Handley Page Model HP 25, two 700 hp Suddley Tiger IIIs) were built for high-wing, semi-monocoque monoplanes with engines mounted in leading edge nacelles and with non-retracting landing gear. The Handley Page machine has a squared-up fuselage cross-section, the Bristol a modified oval. Both machines

have a single tailfin with double fins and rudders.

The Armstrong-Whitworth AW22 (two 700 hp Tiger IIIs) follows along the new low-wing low-wing monoplane formula, with engines in outboard leading edge nacelles and retracting landing gear. Fuselage is of fairly large cross-section, approximately rectangular in shape. The single stabilizer is mounted toward the bottom of the fuselage, fore and aft rudders are double.

Latest Vickers offering in the bombing field is a single-engine full cantilevered monoplane with retracting landing gear. Little seems to be known

about this machine, as it is apparently in the highly experimental class in type.

In the combat class Great Britain evidently sticks to the well-used, single-place fighter formula. Latest example is the Buiou Phantom, designed especially for the international fighter competition organized by the Belgian Ministry of National Defense. It is a single bay biplane of conventional appearance and construction, powered with a twelve-cylinder V-type engine, presumably Rolls-Royce. Outstanding feature is the armament, consisting of four semi-cabin machine guns, two in the wings and two above the engine mount, together with a gun-firing 20 mm. cannon mounted between the engine cylinder banks firing through the hub.

Two other recently announced designs are in the same category, the Lincolnton four-engine experimental fighter, fitted with a Rolls-Royce "Griffon" engine, and the Glanville F-7 50 four-engine fighter



Latest French multi-engine fighter and bomber, the Potez 57.



The two British supercharger biplanes, Bristol and Handley Page.

with the air-cooled radial Bristol Mercury VI engine. The latter machine is said to be somewhat faster than the Gloster Gladiator now standard with the Royal Air Force which are known to do 230 m.p.h. at 15,000 ft.

Interest in large flying boats apparently grows in England, those being some sale in public prints of yield as high as 320,000 lb gross weight. Designs have just been released on the structural arrangements of the Shant Sea and which, although built in 1932, still remains England's largest flying boat. It is a biplane weighing some 31 tons powered with six engines (totaling 8,556 hp.) in three tandem inboard nacelles. A top speed of 150 m.p.h. is claimed. Most recent large British boat is the Supermarine Stranraer, a two-engine boat, a development of the Southampton and Berge types. It is a single-bay biplane, fitted with two Bristol Pegasus XII engines in the leading edge of the upper wing. It is of all metal construction, with fabric covered wings.



ANNOUNCING THE AVAILABILITY OF *Hamilton Standard Constant Speed Control*

A development of equal importance with the development of the first practical Controllable Pitch Propeller for which Hamilton Standard was awarded the Collier Trophy for 1933.

HAMILTON STANDARD PROPELLERS • EAST HARTFORD, CONN.
DIVISION OF UNITED AIRCRAFT MANUFACTURING CORPORATION



Operator's Corner

*An exchange of ideas on the problems of
the commercial aviation industry*

QUESTION 1: Do you consider it necessary for an operator in every week's lesson? What subject forms of insurance do you consider essential? Have you found it possible to maintain fairly complete coverage and still keep spending costs at a reasonable figure? What operation of your spending and put will you be in control? (Indicate by X, Ethel Davis, president, Washington Alcoholic & Temperance Councils, Seattle, Wash.)

West Meets Competition

CARRYING crash insurance, while perhaps not absolutely essential, is prompted by the conservative business sense of this generation. Under present conditions, it is not advisable to add this protection as an after-the-fact rider on a policy in the event of a crash. Such policies cannot typically as important as crash insurance coverage. We do not carry the above protection at this time since it is essential to maintain basic competitive with those of other operators who do not have this insurance. — S. A. DAVIS, Manager, Dyck Young & Service, Los Angeles, Cal.

Improve Flying Techniques

EVERY business is entitled to, and should receive enough revenue from its services to pay for complete and full insurance coverage. However, it is evident that very few service operators, including ourselves, feel that revenues are sufficient to do this.

We carry partial insurance such as public liability, fire and property damage on our airplanes. Crash insurance, we feel, is too expensive for the present value of business and for the partial protection it affords.

Instead of taking out crash insurance, we have made it a point to exercise every known precaution against engine failure by a careful policy of servicing and inspection. In this way we have been able to almost eliminate forced landings.

In addition to the above, we exercise very close control over all flying, and make it a point to see that only properly trained pilots are allowed to fly over country and that all pilots and students are flight-checked systematically and thoroughly and by this policy, we believe we have been able to eliminate many of the needless accidents that occur both domestically and over

technique on the part of the pilot. We lose some business, probably, by not encouraging certain types of pilots to fly our airplanes, but believe that we are ahead in the end.

Department of Commerce statistics show that over 53 per cent of airplane accidents under Miscellaneous Flying Operations are due to pilot errors, the largest single contributing cause being poor technique on the part of pilots. In our opinion, it behooves the flying schools and operators to encourage more attention towards improved flying technique and to exercise more constant supervision in flying.—A. ELLIOTT MERRILL, President Washington Aircraft & Transport Corp., Seattle, Wash.

QUESTION 8: What is your method of saving money for debt reduction, when available? Do you consider them as a checked salary bank or do there is salary plan banks or savings for investments? Have you found it possible to obtain your saving while the new credit or if necessary to reduce it during the release? (Submitted by S. N. Natchana Natchana School)

Pay Increases With Meritocracy

OUR pilots are paid a steadily base pay plus an hourly rate for flying time, plus a night flying bonus per hour. The rate of pay increases with

Question 9

Accession will be published by Cambridge University Press

Have you solved the great transportation problem in your apartment? Have you made arrangements for special dates with her or had some problem or do you provide service with out of town cost? Is the transportation between school and site included in charges for dormitory services or is it reflected separately? Do you charge students additional cost for transportation from or to and from the field, or is the expense absorbed by some other way?

Question 10

January will be published in October

How do you compare operating costs of the various types of aircraft used in flying school operations? What fuel burns do you use? On what basis do you compute depreciation of equipment? (Submitted by Edward A. Meyer, manager, Dover Flying Service, Los Angeles, Cal.)

for the horsepower of the ship. We have found it possible to retain our full fleet of planes the year round. Refuel pilots are not on a lease pay but are paid by the hour; naturally their revenue decreases and increases with the volume of business.—**DR. CAMPBELL, Chief Pilot, United Air Services, Ltd., New York, Ltd.**

Must Lay Off in Winter

OUR pilots are paid straight salaries and although we have not retained one small staff during the winter in the past, it seems advisable to do so, and that is the course we shall pursue in the future. The small operator, having no regular income, encounters great difficulty during the winter months when pleasure flying, chartered trips and student instructions are at their lowest.—**St. A. Azeo Manager, Pore-Jones Flying Service, Inc., Sherfield, Mo.** 2/2

Campanulæ for Winter Work

DUE to our type of operation which involves an extremely long day, it is impossible for us to carry pilots on a salary. We employ two pilots who work on an hourly basis. We find this a fair method of compensation and it is an agreeable one to the pilots as they are paid in proportion to their efforts. Rates of payment are 25 per cent for passenger hopping activities, \$2.50 per hour for student instruction, and \$3 per hour for cross-country flights.

We have found it a necessary evil that prices will rise much less in the winter than in the summer, but we compensate for that by giving them an additional premium of 10 per cent for all business secured by them during these winter months. This not only gives them an additional source of revenue, but helps smooth out the downward curve of winter business. — W. W. KLEIN, *President, St. Louis Flying Service, Rochester, Mo.*

Keep Pilate All Year Around

OUR pilots receive a set base pay plus an hourly rate for all time the equipment is in use, either dual or solo. With our reduced pilot staff, the same number are retained the year around—E. A. Dwyer, Manager, Dwyer Flight Service, Lee, Maryland.

The Maintenance Notebook

Hanger Tractor

MOST airlines have resorted to adopting the simple expedient of buying ordinary farming or road-building tractors for use at their fields and hangars for moving ships about. These machines have proven clumsy and somewhat unsatisfactory, and for that reason United Aircraft's maintenance department, under the direction of Oliver West, set out to develop a new type of equipment which would be adaptable to all their stations and be more suitable for handling the modern transport. Co-operating with the engineers of the Baker-Bausling Company of Cleveland, a small electric tractor has been developed and has just gone into operation at Chicago.

Complete with operator, the tractor is small enough to be driven under the wings of a Boeing 247 transport. In spite of its small size, however, it develops a draw-bar pull of 1,500 lb., sufficient to tow the largest airplane in use on the line under the most adverse conditions. It is contemplated that the design can easily be modified to give draw-bar pull enough to handle ships up to 45,000 lb. gross. A special design of front axle permits a very short turning radius, necessary for maneuver-



This "baby" tractor has been developed by United Aircraft and Baker-Bausling for handling aircraft in hangars and on airports. It is small enough to run under wings and tow aircraft of the Boeing 247's.



Clean rag dispenser and soiled rag container is located adjacent to the stockroom shelves in Pan American Airways' headquarters here. The roller dotted in the older service vestibules for the sock rag bag.

ing in close quarters in hangars. The tractor can be used either to push or to pull a vessel.

The first of the machines to be put in service is designed to take twelve rolls of a lead acid battery with a capacity of 124 amp-hr., or 12 lb.-hr., sufficient for a full day's operation under present conditions. If more capacity is required, however, the overall height can be increased slightly to accommodate a larger battery.

Rag Dispenser

AN ITEM that contributes to the general efficiency of Pan American Airways' Brownsville base is the rag dispenser shown in an accompanying picture. Built of wood, it is divided into two main compartments, one for clean rags and the other for soiled. Clean rags may be pulled through the openings in the side. Soiled rags are dropped into a hutchery in the top into a large canvas bag, which may be removed for emptying.

STILL BREAKING RECORDS

The DC-1...first of the 100 Douglas Transports that have been produced for world use...continues to demonstrate the outstanding superiority of these airplanes. Flying for TWA the DC-1 now holds the coast-to-coast record of 11 hours, 3 minutes, and has established two new world speed records, broken 5 existing world and 3 American records, and set 8 new American records with loads for distances up to 3000 kilometers.

**DOUGLAS
TRANSPORT**



period, the figures reached were not only an astounding 200 per cent better than the figures for March 1933 and March 1934, but also set a new all-time record high of 24,759,694 passenger-miles for the domestic lines alone.

With the season expected, month's record the best so far, there is still an end to the record breaking. April was better than March. May topped April, setting the mark at 27,177,356. Official figures are not yet available for June, but it seems certain to have reached 30,000,000, may even go higher. Pennsylvania reports a 350 per cent increase in number of passengers carried during this month. American Airlines carried 17,297 passengers against 9,133 for the previous June, found that they travelled 343 miles each against a 1934 average of 265. So it went on the whole network.

By July 1, the advancement could be approximately summarized. For one month, passenger traffic had been better than for the corresponding periods of previous years. For us it had come steadily, for four it had reached new heights as high as 247,596,944 each month. Total passenger-miles for the half year (June estimated at 30,000,000) stood close to 185,000,000 against last year's first six-month total of 75,300,000. It had been achieved, too, with a passenger-miles-per-passenger-facility ratio of approximately 35,000,000 to 1, another new, possibly as even more important, record.

Expense and mail payloads were up remarkably, too. First office figures are not yet available subsequent to March



WATERMAN'S ARROWPLANE

is noted that it paid Service of Air Standard Standards of 40 to last year's Service of Air Standard Standards of 30 to 35 m.p.h. Service of Air Standard Standards of 30 to 35 m.p.h. Service of Air Standard Standards of 30 to 35 m.p.h.

and will mean little in comparison with the troubled mail performance of a year ago but the figure for March stood at 645,846,523 1/2-mile per hour, compared with 571,000,000 1/2-mile per hour, best month in 1934. The expense payload graph follows that for passenger traffic in general figures. Steadily improved until March, a peak in 208,560 in that month compared with 135,284 for the preceding year. Another new high in May. And

so on. For the first five months the total payload stood at 1,037,304, an increase of 44 per cent for the period.

The Air Corps

G.H.Q. exercises. Medical research at Wright.

The motions slowly reflected the Air Corps has so far adhered closely to a policy of maintaining the extensive and extensive of the new G.H.Q. air force. The Air Corps has so far adhered closely to a policy of maintaining the extensive and extensive of the new G.H.Q. air force. The Air Corps has so far adhered closely to a policy of maintaining the extensive and extensive of the new G.H.Q. air force.

in and July Langley's planes were on "bombing" and "defending" a number of Virginia cities. And soon, possibly experimental in many phases, including the experiment of temporary promotions, so far limited to but half its planned strength in offensive fighting units, the G.H.Q. would already seem to be demonstrating a new efficiency.

From Wright Field came the announcement of a new unit and program for physiological research designed to study a number of problems connected

Stainless Steel takes Wing



• Aircraft is lighter - stronger - safer - more durable - with stainless steel. Stainless steel has a high strength-weight factor which means greater strength with lighter weight. Valuable pounds are transferred from dead load to pay load - Stainless steel has high fatigue resistance, which means durability and safety. Fatigue failure is minimized. Stainless steel is corrosion-proof even in corrosive salt atmosphere, which means durability without protective coating of any kind. Pounds of paint and dollars of maintenance are saved.

Stainless steel is available in sheet, strip, tubing, wire - all forms and sizes for aircraft fabrication. It can be readily and economically fabricated into complex structures and shapes with joints of 100 per cent efficiency.



Section of fuselage wing fabricated entirely from stainless steel sheet by sheet rolling

Fabrication costs are minimized. Because of these facts stainless steel offers in a new way in aircraft construction.

For heavy-duty work Electromet has no need in the field of ferro-alloys and alloy steels. Information has developed on stainless steel and other alloy steels and their uses is available on request.

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HAMMOND'S Y

not the Bureau's specifications except for top speed. Changes are under way are expected to effect the delivery.

with high performance flying. A whirling arm designed to subject its passengers to various accelerations up to 20 G, a low pressure-low temperature chamber, various types of atmospheric equipment, and standard test standing the effect of oxygen on teeth and lungs are among the apparatus being assembled. Capt. Harry G. Armstrong is in charge.

As an issue to prove, world case that Congress had passed and sent to the President the Wilcox bill giving Market authority for the Air Corps to establish strategy are being developed. Estimated funds required \$10,000,000.

Unified Express

A single express service from Canada to the Argentine results from new setup

Four consumers of the airline's two air express systems would soon do great business, has been the opinion of those observers of the commercial field whose express companies first became an appreciable factor in air transport. More considerations of efficient handling, and the obviously lower rates charged with but a single air-land

would make the move obviously desirable. Do potential shippers to India may even more important. So reasoned the experts.

And so, too, has become airline and its express industry according to a tentative announcement coming from Chicago, July 25 that within 60 days from that date the Railway Express Agency will take over the handling of shipments for the airlines heretofore served by General Air Express. Results: A single bill of lading for all domestic shipments. A single receipt bill and loading for all express exports to Latin America, set up last August by Railway Express and Pan American, now jointly available in all parts of the United States and at some twenty Railway Express offices in Canada.

Eastern Electric

And a few other recent airline developments

More were been added into the mix of operating their extended summer schedules. There was less news last season of airline changes than usual. Borell, United National Parks and Boeing and Hasek organized the new service between in July-August.

Calendar

Aug. 2-4—Western National Air Show, Santa Monica, Cal.

Aug. 3-4—Midwest Airlines Exposition, Omaha, Nebraska

Aug. 26-28—3rd National Air Show, Cleveland, Ohio

Norfolk announced a tentative date, July 29, for the opening of its Norfolk-Spokane service. Frequent flyer reports indicated that July would cut time the road toward new figures.

Most important new equipment news came from Eastern Airlines which has ordered five Lockheed Electras. Delta put the first of its Stinson A transport in service between Atlanta and Dallas. United continued replacement of its 247 Bombers with the Duster 247-10.

Northwest, based out of Spokane by lack of larger facilities of the type required by the Bureau of Air Commerce for interstate operations moved its western maintenance center to Boeing Field, Seattle. Chrysler officials were delighted at a rumor that United is contemplating the transfer of its business offices to that city.

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WHETHER IT'S FAIR OR FOUL
Gulf Aviation Gasoline Carries On

...GULF AVIATION GASOLINE...GULF AVIATION GASOLINE...

"WASHINGTON: clear...unstable ceiling...visibility 20 miles...temperature 75...dewpoint 48...wind calm...sea calm...barometer 30.04...a few scattered clouds on north horizon."

...GULF AVIATION GASOLINE...GULF AVIATION GASOLINE...

"CLEVELAND: low clouds...ceiling scattered at 300 feet...visibility one-half mile...wind moderate...temperature 55...dewpoint 28...wind blowing from north northeast 10 miles an hour...barometer 30.14...fog clearing rapidly."



PILOTS are familiar with the two types of weather reports, shown at the left. The first is the aviator's delight. The second is a horrible example of flying weather.

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Aviation in Congress

1954 FINALLY UNLOCKED

Subject	Discussed By	Forum
SA 1010	Transportation	SA 1010
SA 1011	SA 1011	SA 1011

1954 FAVORABLE REPORTS OUT OF COMMITTEE

SA 1010	Transportation	SA 1010
SA 1011	SA 1011	SA 1011

SA 1010	Transportation	SA 1010
SA 1011	SA 1011	SA 1011

SA 1010	Transportation	SA 1010
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SA 1010	Transportation	SA 1010
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SA 1010	Transportation	SA 1010
SA 1011	SA 1011	SA 1011

SA 1010	Transportation	SA 1010
SA 1011	SA 1011	SA 1011

Foreign Affairs

R.A.F. display, Dutch disasters, an Italian record, feature the news from abroad.

Late June and early July is show time for the Royal Air Force, but has been for the sixteen years, which have shaped over the building of the first R.A.F. aerobically fit and efficient. The first aerobically fit and efficient squadrons are supported and drilled and trained to their highest possible state of skill and efficiency. Royal Air Force aerobically fit and efficient squadrons are the show worth the watching. Royal Air Force aerobically fit and efficient squadrons are the show worth the watching. Royal Air Force aerobically fit and efficient squadrons are the show worth the watching.

Tonight's daily came the news that the seaplane ditched second, held by the enemy from October 1944 and early June 1953, when it was captured by France, was now owned in Italian possession. The second breaking flight had been made in an Italian Pavesi-powered Cheet patrol plane, seaplane, seen in tankings, to 130 others, now starting completion for the Italian Air Force. Pilot, Mario Stoppato, a civilian, accompanied by a military pilot, Emilio Baccini, was seen in the Aeolian Sea, near Sicily, from Trapani to Palermo, in the Strait of Messina (3,800 miles). Time, 4:20 a.m., July 16, to 5:15 a.m. July 17 (24 hours \$5 minimum).

K.L.M.'s Lockheed No. 1 airline whose safety record over 15 years of operation had been the envy of European operators, last month lost three ships within the space of a single week.

(1) July 14, a Fokker at the Amsterdam Airport. Two engines failed on the take-off. A harrierack was attempted, altitude lost. The ship struck a dike under construction, caught fire immediately. Lost four of five crew members, two of three passengers.

(X) July 17, a Douglas near Bush's Point. Forced down on a beach, the ship was wrecked in an attempt to take off again, was destroyed by fire. Unhurt, the crew of four and the seven passengers.

(2) July 23, a Douglas near P'u San (Gaoan), in Indian Sowerland. A violent storm, torrential rain, reported power plant difficulties. The plane crashed into a pine forest on the side of a mountain. Killed: the entire crew of four, all the most experienced.

Almost consistent with these data?

pilgrims, on the official report on the accident to KLM's first Deacon in Rotterdam Wells last fall. The investigation commission of the refinery, headed by first police, proof of the cause. It was certain only that weather conditions had been very bad, that the pilot had been negligent, and that the aircraft had stepped in rain but when conditions became increasingly violent. Beyond that, the refinery's notes may have been the flying characteristics in the plane in rough weather, the lack of presence of the pilots with that portable machine and the language of the pilot. The aircraft was probably not caused by the lightning or technical accident.

Airship Forum

Lighter than air conference in Akron may accelerate decision on program.

Sovietos were seen at American technical meetings, an airship forum, was scheduled for July 25-26, at Akron under the auspices of the Daniel Guggenheim Airship Institute. Gromov was "to review the present status of lighter-than-air from the engineering and scientific viewpoint," according to Dr. Theodore

AVIATION
August 1981

Trotsky, Director of the Institute, and advised the preliminary body of conference members seemed adequate to the task.

Chairman of the technical section was Dr. G. W. Lewis (NACA). Co-chairs were Dr. W. F. Durand (Stanford University), Dr. H. G. Gortler (University of Michigan), Prof. C. E. Rensselaer, L. Coats P. W. Ketchum, C. P. Burgin (Bureau of Aeronautics), Dr. R. S. Southwell (Oxford), Dr. Tino Vianello (University of California), Dr. G. B. W. Lomax (Pratt & Whitney), Dr. J. C. Hunsaker (MIT), Prof. W. H. Thompson (MIT), Prof. A. V. Forster (MIT), Dr. Karl Arntsen (University of Illinois), Dr. E. R. Van Dine (Aircraft Engineering), R. H. Brown, B. R. Rogers, D. M. Little (Wright Brothers), Dr. Max N. Munk (Catholics U.), L. B. Tuckerman (Bureau of Aeronautics), and James D. Coatsworth (MIT).

Including as it did many members of President Roosevelt's Science Advisory Board, assembled after the Hiroshima crash to report on the government's light-duty car program, and practically every leading light-bulb-or scientist in the country, the meeting was expected to do much toward expediting action by that committee.

Meanwhile at Lakeland where mooring-out experiments are still under way with the Los Angeles, work has been started on the dismantling of the high mooring mast. Since it was rendered obsolete several years ago by the development of the mobile-stow type of mooring device the mast's removal seemed no indication of further enhancement to the station. Fraynes rather



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POLYMER LETTERS

is French for the house. The place had summer when Monsieur "Muguet" domain, against his best domestic instincts, his back of indifference has still into the French and hundreds of "Père" like it, was here since. Probably fifty have reached their beds. It is said to be still it and underhand.

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Still More Records

A loaded amphibian, and a four-seater are added to America's score. Ingals spans continent

CHICAGO F.A.I. ratings on category divisions, when all types of aircraft are included, put some 150 possible international records for male pilots in air for 1934. In the middle of June the efforts of Benjamin King in a first equipped America put America ahead of France at the society holding the grante number. On the 27th of that month, Lt. Col. Richard L. Barker of the Coast Guard set the first altitude record ever established for an amphibian, carrying a payload of 1,200 lb. Using a 200-hp Wright-powered Grumman F-3 Utility, he ascended to 16,000 ft. above his base at Cape May. This added another mark to the American total. A week earlier flying the same ship Lieutenant Barker bettered Major Aldrich's recently established speed mark for amphibians, carrying 1,100 lb. over a 60-mile course by covering the distance at 371.50 m.p.h.

The F.A.I. also was fit to recognize the best level performance in any of the 186 categories. That explains a flight by Major Donald Bruner at the Tulsa Air Races. Flying a Spartan C2, powered with a 60 hp Jacobs, he covered a 60-mile course at the rate of 79.80 m.p.h. That set a new mark for single seated light planes, weighing less than 1,000 lb. empty. American international total after the Bruner flight was 44.

Harder to do than any of these but of less international significance was the flight July 18 from Los Angeles in a four-powered Lockheed Orion, from Royal Bruntz, under the leadership of Bert, two, negative hours and twenty minutes, is slower than the twenty minutes for the world record, crossing of negative hours and eight minutes, but it was the first sustained non-stop transcontinental ever made by a woman, and promises well for Miss Ingals' assumed project of modifying the Zivko built on a return trip.

Bust of the Year

Strutless falls during landing in Bled Hills bawl

RECENT BALLOON work back was the Explorer II, this year's Air Corps Generalized Society candidate for struts' honors. Fully inflated it had a gross weight of 3,000-400 lbs. was heavier than the airship. Los Angeles Explorer I had, last July, burst at 60,000 ft. during its crew in take to their parachute, mistaking the explosion's scientific instruments in the resulting crash.

Explorer II consequently had been designed with larger safety factors—used

before in place of hydrogen, was subjected to a minimum of loading. Ready June 5, the struts were used for work in a hard-like valley near Rapid City, S. D., and particularly clear weather should become a practical criticism.

Finally on the evening of July 31, in very circumstances seemed favorable and the inflation was begun. At 3 a.m. it was nearly completed. Captain Orel Anderson, pilot and Albert W. Stevens assisted but warning precipitation before entering the gondola. Suddenly came a down from one of the inflation crew, a whistling sound. Before the workers about the gondola could escape they were enveloped with snow of the light-colored debris. It was assumed. Snow was then in a jar. But the envelope with a long run down top to stationary band, would require at least a few to blow for its repair. Plans at the end of the month will reveal final report on the failure's cause, including the possibility of earlier attempt this summer from a less noticeable spot.

Racer's Reward

Bigger purses and a more varied program to feature National Air Races

TOMMY WITT, the \$50,000 in prize money paid at the Cleveland race this year. The purchase jumpers will get \$500 of it. There is another \$12,500 which will only be awarded for a new transcontinental record. But the remaining \$46,750 for twelve races in a record jump from last year's \$31,800 for ten races. Chief beneficiaries are the three trophy events, which bring \$14,000 against last year's \$3,100, and the Thompson stake which will divide \$15,000 among the first five contestants in comparison with \$3,000 paid last year.

Other changes promise a wider interest than last year's program of

machines of 100, and by professional men.

(1) The water reaper on the program is 540' barred from all other events, they will compete at Event No. 4 (see accompanying chart). A handicapped race it is scheduled in a field of eight planes of A.T.C. construction with top speeds not in excess of 130 m.p.h.

(2) There will be two events (Nos. 1 and 2) for the planes of party A.T.C. construction and bearing C type licenses from the Department of Commerce.

(3) The Thompson Trophy race will this year be over a 15-mile course instead of the 5-mile race and last year, will be 150 instead of 100 miles in total length.

Elmira Meet

The Sporting Societies Sixth Annual Contest a marked success. Du Pont still the top

More events entered (36), more secondary races (26), more evening flights (105), more main trophy events (26), more prepared men (4) are some of the figures which distinguish this year's contest of the Sporting Society, held June 30-July 14 at Elmira, from its five predecessors.

There were other advantages. The trophy and prize list was more complete than ever before. The men were not only more numerous but had recovered a deal of accuracy by rifle marksmen. Six No. 1 on Harris ridge, was outstanding. It had this year, for the first time, a general judge for the weather station, a grand stand for spectators. It was large enough to permit extensive radio-broadcasting, and a new plane. Sixty-three entered was an act of substantial assistance had been forthcoming from

AVIATION
August, 1935

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Airline traffic cannot but see the advantages of travel in amphibious equipment of unsurpassable performance in the modern airplane transport. The ability to make waterfront landings and takeoffs enables the S-43 to materially reduce the elapsed time between cities. To eliminate such time wastage was a major design requirement of the newest Sikorsky product.

The possibilities for increased business in such industries is revealed time and again. Undoubtedly in view of the fact that has been shown in recent history, the S-43 is one of the most perfectly sound-proved planes yet designed.



Program of Events for 1935 National Air Races

CLEVELAND MUNICIPAL AIRPORT

Date	Event	Time	Distance	Class	Qualifying
					Time
					(m.p.h.)
Aug. 30	1	1	10	1	200
	2	1	10	2	200
	3	1	10	3	200
	4	1	10	4	200
	5	1	10	5	200
	6	1	10	6	200
	7	1	10	7	200
	8	1	10	8	200
	9	1	10	9	200
	10	1	10	10	200
	11	1	10	11	200
	12	1	10	12	200

*Times only. *A.T.C. (pilot only)

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Arthur S. Kline and J. L. Ramsey. 440 pages, 412
illustrations. \$10.00 |
| 2. NEW AIRPLANE AND AIR ENGINE , by Charles E. Hall
and George H. Taylor. 440 pages, 1542
illustrations. \$10.00 | 11. A HANDBOOK OF AIRCRAFT , by F. Alexander Murray and
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Schools, Services, and Airports

■ **ALABAMA**—Stanford Adler, manager of the Birmingham Municipal Airport, reports that activities at that field were lighter during the first six months of 1955 than during any previous period since the airport was opened four years ago. Four commercial operators are now based at the field, two of which are giving flight instruction, and since there are also twelve privately owned planes stored at the field, the service work keeps the shop constantly busy. A state fair, running from a two-day air show at Birmingham, is planned for September. Transportation officials, after abandoning previous projects, set at much higher figures, have asked for \$15,800 of relief funds to be spent on expanded airport projects. The City Council of Birmingham has approved an appropriation of \$1,450 as the town's share of a \$5,950 fund to be used to complete the municipal airport.

■ **ARIZONA**—The future of Sky Harbor Airport at Phoenix seemed in doubt last month when the Board of Supervisors of Maricopa County agreed to accept construction of the airport, signed a year ago, under which the Aerial Investment Company had agreed to carry on operations at the airport over a five-year period in exchange for the income from a lease by the county. Several adequate plans to insure the continuance of operations have been suggested.

■ **ARKANSAS**—Louis Garver has been re-elected president of the Arkansas Airport Co., owners of Tony Field, Texarkana. The field is one of the few airports in the state which are not maintained by public funds and is completely equipped with modern facilities, including a control tower. Other officers elected are: George H. Adams, secretary; Kenneth Garret, executive vice-president and general manager; F. J. Smith, vice-president; J. S. Smith, treasurer; Leslie Lee, assistant secretary and executive treasurer. Louis Garver was also re-elected as president of the Pine Bluff Airport Club.

■ **CALIFORNIA**—Nearly 130 planes flew in to attend the dedication of Fresno County's new airport at Clovis, July 4. Developed with SERRA funds on a site purchased by the county, the field has an old runway 590x120 ft. . . . Another well attended, 4th of July air show was that held at Orange field, Orange. . . . A fire followed by a tank



TWO KEYS
Alpine and Fred, in flight over the field, showed their new record table chart of a set month by less than three days.

exploding destroyed two planes and damaged No. 3 on the Santa Catalina airport late in June. . . . Work has been started by 25 relief workers on an airport project in Humboldt County, a short distance north of Eureka. . . . Final approval has been secured for improvements of Santa Ana's airport to cost \$40,000. . . . The \$200,000 program of construction, which will give San Francisco municipal airport a 1,500 ft. east-west runway, has entered a second phase as the contractors who built the latest runway, the project field around the field to place the flying. . . . Stevenson was scheduled to use its first income as a heavy-duty line in August when it will be used by the planes from the field's carriers. . . . Fifty high school vocational students are enrolled in the fourth annual special summer course offered by the Curtiss-Wright Technical Institute at Grassano. . . . The flying school at Oakland inaugurated a new line in graduation exercises for its 21st year, the diploma being awarded the graduates in July. . . . The school's Boeing B-24 aircraft. . . . The

Ryan Aeronautical Company reports a 40% per cent increase in its passenger business since the opening of the San Diego Exposition of May 29.

■ **CONNECTICUT**—The new Waterbury-Pawcatuck Airport on Mount Yale was opened June 30 with an accident. Capt. Frederick F. Stevens who is to be manager of the new field plans to open a branch of his Braniff Field Air College there as soon as hangars can be completed. . . . Division of Public Works (Golden) has applied for additional SERRA funds to continue the filling and grading work at the New Britain municipal airport.

■ **FLORIDA**—The American Airways has accepted a contract approved by the Texas Board of Aeronautics last spring, calling for the operation and management of the Davis Island site as an airport for daily use. Meanwhile a boat has been filed with the Army engineers selling forth the units of a project to build a \$125,000 breakwater at the site.

state haggles, fire protection installation, radio and a gymnasium, would cost \$1,171,000. . . . Harold Newman, Asst. Dir., for Mass. and Gordon M. Mayberry headlined an airshow at Fair Coliseum late in June. Plans have been approved for a new administrative building for Linden airport, Connecticut. The runway will also be greatly enlarged by enlarging the Little Maule Road as it does just the field, provided federal relief funds are forthcoming for the project.

●**OKLAHOMA**—Highlights of the Tulsa Southern Air Races June 30 and July 4: the landing of 21 planes carrying 64 participants at the Western Oklahoma air tour from Oklahoma City, June 29, the 30,000 sound of the 30th, the aviation program presided by Billie Parker in a 1930 padon, Clio Scholt's hot-wing drops, Miss Ranshaw's one wheel landing, the quad-engine doctor, Art Chester who sang the 37th in class, and the J. D. Brook plane at 2563 m.p.h., Roger Don Ray's first place in the 30 mile race for all at 205 m.p.h., Roy West working the stock model race at 157 m.p.h., John Carroll, long chair instructor of the Spartan flying school at Tulsa has joined TWA as a co-pilot.

●**OREGON**—A new state board of aeronautics has been established, Dr. Raymond Stach (Portland) was named William Varney, J. E. (Till) Barker and Arthur Whitaker, all of Portland, and T. R. Gilchriston (Klamath Falls) are new members.

●**PENNSYLVANIA**—A new opening company, the Williamsport Airport, has been incorporated and will operate from the Commonwealth airport. . . . A big increase in business during June, was reported by Harold D. Sussak, manager of the Schuylkill airport. Visitors' numbers are falling eight per cent. Two planes were sold. Varying planes were at a new high. . . . A flying school has been opened at the Millersburg airport near Millersburg. . . . The Working Valley airport near Williamsport, closed since January for extensive improvements, has reopened July 1. It would be attended on a weekly basis in June at the Millersburg airport, Reading. . . . Allentown City has been awarded \$500,000 of PWA funds to better part of the cost of a \$500,000 improvement program planned for the City-County airport.

●**RHODE ISLAND**—Two recent letters, which put down a total of 25,000 fitter than at 16 ft. concrete this per day, have made such progress at the State Airport at Hingham that the \$400,000 PWA project is now expected to be finished by Aug. 15, some two weeks ahead of schedule.

●**SOUTH CAROLINA**—Last Monday S. Blair has been put in charge of the operation and maintenance of the Charleston Airport. A new program of airport improvements throughout the state is being prepared by Dexter Martin, of Greenville, recently appointed director of state aviation. The lighting of the Charleston Coliseum - Spaulding race will also be speeded. . . . An airshow was held at Hartsville, July 4.

●**SOUTH DAKOTA**—Through the efforts of the Junior Chamber of Commerce, Brookings has won early construction of a hangar and an office building. Both are of concrete block construction. The hangar, Model B, is to be completed by Sept. 1.

●**TENNESSEE**—The Bureau of Air Commerce air traffic rules and licensing requirements were adopted for the state by the Aeronautics Committee at a meeting with ex chairman H. S. Wilkins, state highway commissioner. . . . The city of Memphis is purchasing its municipal airport. . . . Airport improvements of Kentucky City, Harpeth and Knoxville met late in June to prepare plans for a tri-city airport project. . . . A completely new airport for Nashville, to be located on a 317 acre tract 5 miles from the city on the Murfreesboro Road, and to cost \$250,000 has been secured according to Meyer Hines Construction, to meet by September. . . . Many districts in new airport late in June.

●**TEXAS**—The city council of Fort Worth has agreed to grade, drain, and

extend the municipal airport, at a cost of about \$30,000 in comparison with plans to build local landing equipment there. . . . Work on an airport for Lawrence was started last in June.

●**VIRGINIA**—The first airshow of the season at Shenandoah airport took place last in June. Harold W. Page, manager of the field, was the welcomed face in his Waco. The field has been relinquished in a part of entry by the Customs Division of the Treasury Department.

●**VIRGINIA**—The committee in charge of arrangements for the statewide air tour, David Satterfield (Richmond) chairman, are seeking towns where the tour's visit would help promote airport building projects. The tour is scheduled for early fall. . . . The state corporation commission has issued a license to Piedmont airfield, authorizing operation of its new airport. . . . Construction of a concrete apron and of an asphalt surface for the north-west runway has been started at Roanoke. . . . Working conditions are underway at Newmarket, New.

●**WASHINGTON**—Mayor Charles L. Smith, of Seattle, who recently published his report by having a "hot hot" contest in the town square made his first solo flight after seven hours of instruction with Leonard R. Petersen, Inc., of Boeing Field. . . . Capt. Carlton F. Bond, co-commander of Patton's field, Vancouver, was commanding a patrol squadron at Berkeley Field. . . . New group of 2728 Boeings in that company's plant in Seattle for repair last month. . . . Re-opening improvements are underway at Glendale airport.

●**WEST VIRGINIA**—Opening of the new administration building in Charleston, West Virginia, for aviation has been completed. Chris Russell, manager of the field reported that June had been the busiest in its history. . . . Operations were opened July 1 at the new Weston airport by Roger Sullivan. . . . The Hurricane site or the proposed Huntington-Charleston airport has been rejected. Other locations are being investigated. . . . Elmer C. Floyd former flying instructor at Elmore, has joined American Airlines as a co-pilot. . . . Aeronautics department in airport July 4 with elaborate ceremonies.

●**WISCONSIN**—Five places carrying diagrams of the Veterans of Foreign Wars made a wide tour of the state late in June. The Fox River municipal airport has been completed after sixteen months of intermittent work. . . . The Corbin-Witch airport at Milwaukee, of which Edward J. Mahick is manager, was the scene of an airshow July 14.

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THE TAYLOR "CUB" AMERICAN SAFE PLANE

Sets a New Altitude Record in Sales



Lower to the Taylor Altitude Record at Bedford, Pennsylvania.

60 "CUBS" bought in May and June

\$1425 A TAYLOR "CUB" sets the record. It was flying at 10,000 feet in the first 100 ft. in the air and then it flew safely, steadily and successfully. The Taylor "CUB" is the lightest airplane sold in America. Other features: 40 ft. wingspan, 10 ft. wheelbase, 10 ft. fuselage, 10 ft. tail, 10 ft. landing gear, 10 ft. engine, 10 ft. propeller, 10 ft. fuel tank, 10 ft. oil tank, 10 ft. battery, 10 ft. lights, 10 ft. horn, 10 ft. bell, 10 ft. whistle, 10 ft. siren, 10 ft. alarm, 10 ft. bell, 10 ft. whistle, 10 ft. siren, 10 ft. alarm.

\$1495 Taylor "CUB" sets the record. It was flying at 10,000 feet in the first 100 ft. in the air and then it flew safely, steadily and successfully. The Taylor "CUB" is the lightest airplane sold in America. Other features: 40 ft. wingspan, 10 ft. wheelbase, 10 ft. fuselage, 10 ft. tail, 10 ft. landing gear, 10 ft. engine, 10 ft. propeller, 10 ft. fuel tank, 10 ft. oil tank, 10 ft. battery, 10 ft. lights, 10 ft. horn, 10 ft. bell, 10 ft. whistle, 10 ft. siren, 10 ft. alarm.

\$895 Taylor "CUB" sets the record. It was flying at 10,000 feet in the first 100 ft. in the air and then it flew safely, steadily and successfully. The Taylor "CUB" is the lightest airplane sold in America. Other features: 40 ft. wingspan, 10 ft. wheelbase, 10 ft. fuselage, 10 ft. tail, 10 ft. landing gear, 10 ft. engine, 10 ft. propeller, 10 ft. fuel tank, 10 ft. oil tank, 10 ft. battery, 10 ft. lights, 10 ft. horn, 10 ft. bell, 10 ft. whistle, 10 ft. siren, 10 ft. alarm.

NEW FIVE-PISTON PLANE Taylor "CUB" sets the record. It was flying at 10,000 feet in the first 100 ft. in the air and then it flew safely, steadily and successfully. The Taylor "CUB" is the lightest airplane sold in America. Other features: 40 ft. wingspan, 10 ft. wheelbase, 10 ft. fuselage, 10 ft. tail, 10 ft. landing gear, 10 ft. engine, 10 ft. propeller, 10 ft. fuel tank, 10 ft. oil tank, 10 ft. battery, 10 ft. lights, 10 ft. horn, 10 ft. bell, 10 ft. whistle, 10 ft. siren, 10 ft. alarm.

Aviation People

• Owing that the development of the Army-Kearny type of float flying equipment "adds another definite step to the safety and convenience of flying under any and all conditions," and that the part to be played in that development is the greatest achievement in aviation in America during the past year," the winners in award of the Collier Trophy have selected Capt. ALBERT HENNINGSEN as that year's recipient. He already holds the Distinguished Flying Cross for his flight to Honolulu with Captain Maitland.

• Because he is a "hardiest contributor to man's mastery of the air, skilled and successful designer of ships which have continued to outstand in swift new kinds of invention," Yale University late in June bestowed the degree of Honorary Master of Science upon Isaac Strouss.

• A letter of commendation for his successful experimentation in the field of gliding and soaring flight has been awarded Lt.-Colonel RALPH BARNARD by the Secretary of the Navy. In charge of glider training at Pensacola, this year's president of the National Soaring Society, Commodore Barnard has followed developments in glider flight since his first experiments in a home-made glider in 1908, holds U. S. Soaring license No. 1.

• A trophy and \$1,500 of prize money has been given with officials of the National Air Races by RAYNOLD GARDNER, circus aerial and looped previous pilot to revive the transcontinental sportsman's club order. Having field Los Angeles Municipal Airport.

• A J. HENRY HANSEN has been appointed manager of the aviation sales department of Shell Eastern Petroleum Products with headquarters in New York. With Shell as assistant manager of the department since 1933, Hansen previously, May, Gen. Insp., now with Sevenson Aircraft.

• The Reynolds Appliances Corporation of Chicago announces the appointment of RALPH Q. WILSON to the post of industrial adviser and assistant to the president, Milton Reynolds. Wilson, who from the Adams, first in Harvard and return, was held the non-aviation education record.

• R. S. KNOWLTON, Early Bird was the first five and since 1928 aviation pilot at the Kansas City Star, has been

appointed to the public relations department of Transcontinental & Western Air, Inc.

• An Inter-Departmental Committee on civil international aviation was appointed early last month by President Roosevelt. At its first meeting R. WALLACE MOORE, Assistant Secretary of State, was elected chairman. The other members are STEPHEN E. GIBBINS, Assistant Secretary of the Treasury, HARRIS BRANSON, Second Assistant Postmaster General, and JOHN MARSH LUTHER, Assistant Secretary of Commerce.

• New president of Northwest Airlines is LOUIS H. LEVINGSTON, vice-president Archer, Dows, Midland Company, Minneapolis. He succeeds SENEY H. ARNDSON, who resigned several months ago but who remains a director.

• A graduate of the Naval Academy, a confirmed inventor, LIEUT. WILLIAM L. MAXSON has resigned from the Navy to become consulting engineer for the Franklin Aircraft Company, at Woodville, N. J. Last summer invention to date, a computing gasoline pump used at most flying stations.

• Reassigning a post in finance affairs for Dallas, Tex., STREET BAKER has joined the Trans Airways as assistant to president T. E. BRADLEY.

• H. C. BOWMAN, active in aviation in the Southwest for a number of years and with experience on Salsbery, United and Boeing Airlines, has been made traffic manager at Tulsa by American Airlines. He takes the place of J. M. KRAMER, recently killed in an automobile accident.

• With twenty years of active flying in chasing night of continuous airline service behind him, FREDERICK WERTSCH, dean of U.S. pilots, has taken up duties as assistant to W. W. Cline representative of operations.

• MURRAY D. MILLER, former sales manager for the Roush-Rand Corporation of Kansas City, Mo., has been made assistant to the president, in charge of sales, by the American Airlines.

• Following two years service as Inspector of civil aviation at Boeing, LIEUT. WARD C. GARDNER, U.S.N., has been assigned to VP-1 Squadron stationed at San Diego. LIEUT. COLBERT, a



Capt. Albert Henningesen



Isaac Strouss



Lt.-Colonel Ralph Barnard



Raynold Gardner



J. Henry Hansen



R. S. Knowlton



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AVIATION'S Card Index of New Equipment

This department is designed to help readers locate manufacturers of new parts, accessories or materials

AIRPLANE ACCESSORIES

Brake Control

Arrault Products Corporation,
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MASTER cylinder, remote chamber landing drive and valves for hydraulic brake incorporated in one unit for cockpit mounting. Separate unit required for each brake. Connected to rubber pedals for ordinary operation, valve control and handle provided for parking. Parking brake released by locking rubber pedals. Specifications on request.

AVIATION, August, 1935

AIRPLANE ACCESSORIES

Landing Light

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Ovando, Ohio

SELF-CONTAINED motor driven, removable light for installation on lower surface of wing. Governed to open at 250 m.p.h. speed. Three-way switch in cockpit controls filament and motor circuits. Light may be turned on at will in full extended position. Twelve volt 35 amp. 115 candle power pre-focused lamp. Weight, 34 lb. Described by Nicholas Beaulieu, Co.

AVIATION, August, 1935

AIRPLANE ACCESSORIES

Navigation Aid

Aviation Division,
Ford Motor Co., Dearborn, Mich.

TYPE C radio-aid, invention of T. E. Halpin, is designed to give pilot all available information on stream, radio-wave beacons, airports, traffic rules, etc. Data kept up to date by frequent transmissions. Maps mounted on rollers, easily shifted as flight progresses. Incorporates radio range indicator. Built of aluminum, movable dials. Weight complete, 45 lb.

AVIATION, August, 1935

AIRPLANE EQUIPMENT

Hydraulic Pump

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Poughkeepsie, Long Island, N. Y.

A compound variable gear type, hand operated for pressures to 500 lb. per sq. in. May be power operated at 1,000 lb. per sq. in. Operates two separate hydraulic actuating or control cylinders at same time. For cockpit mounting. Control valve incorporated. Weight, 45 lb.; longest dimension 11 in.

AVIATION, August, 1935

GAUGE

Compass Indicator

Sancliff Aircraft Radio Co.,
3734 West 53d St., Chicago, Ill.

NEW radio compass operates effectively on ordinary V-type vacuum instead of shielded lamp. Includes duplex room or on range 150 to 430 kc. for better reception, 850 to 1,500 kc. for broadcast. Remote or direct control. Overall size 8 in. x 2 in. x 4 in., plus remote control panel 4 in. x 6 in. x 2 in. Total weight 38 lb.

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A NEW type of chain hoist which should prove useful in aircraft shops is the Vale Pull-Lift. May be used in either horizontal or vertical position, both for pull and for lift. Compact and portable. Incorporates lever operated ratchet for applying power. Moving parts completely enclosed. Operation as positive. Capacities 2, 3, 4, and 6 tons.

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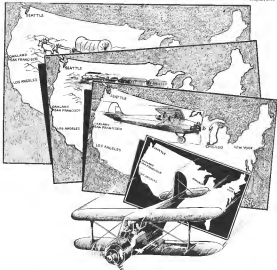
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